FREEPORT-MCMORAN COPPER & GOLD

CONTRACTOR HEALTH AND SAFETY MANUAL

JANUARY 2012

EXPIRES JULY 1, 2012 Please destroy any copies published before and up to this date and reference only the latest document from the DOHS web share.

January 2012

Revision 2

PROJECT NAME: _____

PROJECT NUMBER: _____

PROJECT MANAGER: _____

E-mail: _____

Phone: _____

EMERGENCY NUMBER: _____

SAFETY CONTACT: _____

GLOBAL SUPPLY CHAIN CONTACT: _____

ENVIRONMENTAL CONTACT: _____

A copy of the most recent Contractor Safety Manual must be available on site and available for reference and review during the course of the project.

Revision History

Rev	Section	Description of Change	Effective Date
0	Initial release		
1	Section 11.10	Added HDPE Pipe Guidelines:	May 2011
2	Section 1.3.1 pg. 19 Section 1.6 pg. 20 Section 1.8 pg. 21 Section 5.16 pg. 61 Section 10.4 Section 11.3 Section 11.6	Added sentence re: contractor attending monthly safety meetings Added bullet point re: reporting man hours Changed title, added sentence re: periodic inspections Added sentence re: inspecting electric powered tools Added wording re: tampering with drug/alcohol testing samples Added Revised Blasting Guidelines Added Revised Confined Space Guidelines	January 2012

Contents

Vision

The Freeport-McMoRan Copper & Gold Contractor Safety Manual describes project requirements designed to:

- Protect the lives and health of employees of Freeport-McMoRan and contractors working on all Freeport-McMoRan locations, as well as the general public
- Prevent damage to property, materials, equipment and supplies
- Protect the workplace environment
- Comply with all applicable laws and regulations

Mission

To maintain an injury-free and productive workplace by actively promoting safety and health measures with contractors and suppliers. Freeport-McMoRan seeks to establish relationships with its contractors and suppliers based on mutual trust, cooperation and communication, as we strive to achieve our corporate vision of zero incidents, injuries, fatalities and occupational illnesses.

Mission Goals

- Encourage safe production with the objective of zero incidents, injuries, occupational illnesses and absolute elimination of fatalities
- Align safety standards of contractors and suppliers with Freeport-McMoRan expectations and philosophies
- Promote and establish a drug-free work environment
- Mitigate the impact of litigation caused by injuries involving contractors' and suppliers' employees
- Emphasize the value of:
    - Proactive management of risk
    - Safety pre-project/pre-task planning
    - Safety orientation and training
    - Incident investigation and analysis
    - Constant communication of safety expectations and employee monitoring
    - Meet or exceed compliance with regulatory requirements for safety and health

- Compliance with all Freeport-McMoRan site-specific safety and health requirements

These goals will be achieved through the common effort of Freeport-McMoRan and its contracting partners. All individuals working on Freeport-McMoRan projects must ensure that activities which fall within their range of expertise and responsibility comply with the safety and health requirements of this manual.

It is the firm belief of Freeport-McMoRan that all incidents are preventable through commitment, participation and cooperation of all parties involved by:

- Emphasizing prevention by taking proactive steps that reduce the likelihood of an incident
- Ensuring full application of and conformance with local, state and country laws and regulations
- Ensuring compliance with the components of this manual, in addition to any site-specific H&S requirements
- Issuing clear and concise instructions and holding individuals accountable for their safety responsibilities, including all activities within their work area
- Providing all adequate and necessary H&S resources and leadership required to achieve these goals

This project safety manual is considered one of the contract documents. All contractors shall, and are required to, ensure that their employees, subcontractors, suppliers, vendors and visitors comply with the provisions of this manual pertaining to the work to be completed. The contractor also must become familiar with the Freeport-McMoRan site specific H&S policies which may exist where work is to be conducted (i.e. LOTOTO, confined space entry, fall protection, excavation). Where differences in detail or requirements exist between this manual and a site-specific requirement, the more stringent policy will prevail. Non-compliance with safety requirements as identified herein may result in work stoppage or removal of the employee(s) and/or contractor from the work site. Any willful or repeated non-compliance will result in contractor dismissal.

National, regional, local regulations, international country regulations and other safety codes and site standards are part of the contract. The ultimate responsibility for providing a safe place to work rests with each individual contractor and its employees. Regulatory compliance is the responsibility of

each contractor. This manual is not to be construed as superseding federal, regional or local regulations. Nor is this document a definitive or comprehensive listing or description of the applicable rules and regulations.

Statement of Policy

The goal of Freeport-McMoRan, and thereby the goal of all contractors, employees and visitors on the site, is to prevent all incidents and to provide a safe and healthy work environment. It is expected that all personnel will be committed to that end. All contract personnel are responsible to work safely and immediately resolve any unsafe conditions or observed at-risk behaviors.

NOTE: There will be 100% reporting of all work-related injuries and occupational illnesses, (including serious "near-misses"), property damage, fires, etc. to Freeport-McMoRan site management. Failure to report injuries, illnesses, or serious near-misses will be construed as a violation of contract obligations. Reporting of those events is to be immediate.

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Corporate Safety and Health Policy Statement

The safety and health of all Freeport-McMoRan Copper & Gold Inc. employees, along with our commitment to the environment, are of the highest priority. Our objective is zero work place injuries and occupational illnesses. Certainly, production and costs are critical to the well-being of the Company, but these considerations must never take precedence over safety, employee health or the environment. We believe that all injuries and occupational illnesses are preventable. We further believe that safety and health considerations are integral to, and compatible with, all other management functions in the organization and that proper safety and health management will enhance rather than adversely affect production or costs.

A fundamental tenet of our policy is that there will be compliance with applicable internal and external safety and health standards. Because safety and health is a line management responsibility, safety and health policies and practices must be actively supported by management. In addition each employee must take individual responsibility for safety. It is the job of each employee to create a work environment that eliminates occupational health and safety hazards whenever possible. If a hazard cannot be eliminated, then employees must work together to ensure that it is effectively controlled. Assigning responsibility and determining accountability measures for safety and health performance must be established at all levels of management. The Board of Directors will monitor and receive regular reports on outcomes and results.

We will measure progress to attaining our objectives against regularly established benchmarks. We will provide the training and resources necessary to achieve our safety and health benchmarks, and management will be held accountable for the results. Management must discharge its safety and health responsibilities in a timely, effective, and ongoing manner to do its part in preventing injuries, and preserving the health of those under its supervision.

Employees will be properly trained and held accountable for following all prescribed safety procedures and practices. Safety and health issues will not be compromised. Each employee is responsible for their own personal safety and the environment in which they work. No job will be considered so important, and no schedule so urgent, that time cannot be taken to perform work in a safe manner. Working safely is a condition of employment.

As a matter of philosophy and practice, we will hold all contractors operating at our facilities accountable for the same level of safety that we expect of ourselves. All contracts will include specific safety provisions designed to achieve this result.

We will conduct comprehensive safety audits and industrial health audits on a regular basis at our operations (both domestic and international) to evaluate the status of compliance with our safety and health programs and will communicate that information to senior management.

The staffs of safety professionals working in our operating units are charged with assisting line management in achieving their safety and health objectives. They will provide management with analysis, assist management in developing and implementing effective safety programs, and will design the methods to effectively measure safety performance. They will also analyze results and make recommendations to improve performance.

We are committed to provide a safe and healthy work place and to provide adequate resources through training programs, safety incentive programs, and occupational health programs to attain recognized leadership. We consider safety and health programs, both on and off the job, to be an investment in our most valuable resource - our employees.

Adopted by Freeport McMoRan Copper & Gold Inc. Board of Directors
Date: July 31, 2007

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1.0
Administration and Responsibilities

1.1 Definitions

Contractor - Project manager, general or prime contractor, subcontractor or supplier working on the site.

NOTE: Visitors, consultants, delivery personnel (such as UPS or Federal Express; beverage vendors; paper products vendors; infrequent reagent handlers [for this purpose, infrequent is defined as fewer than six days per year]), individuals working in offices, etc. are exempt from requirements of the following sections: 1.3; 1.4; 1.6; 2.2.1; 3.2.2.; 4.1; 4.2; 4.3; 6.4; 9.1; and 9.2 except where determined otherwise by the Project Manager or unless they are or would be exposed to chemical and/or physical industrial hazards in the course of the work they are performing.

The company does reserve the right to conduct for-cause or reasonable suspicion testing of any persons on company property. Any person refusing to submit to testing, or comply with the request to be tested shall be denied access to the property.

Owner - The entity having possession and control of the site and overall operations.

Competent Person - A person designated by the contractor who, through education, training and experience is capable of identifying existing and predictable hazards in surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authority to take prompt, corrective measures to eliminate them; one having abilities and experience that fully qualifies him/her to perform the duty to which he/she is assigned.

Imminent Danger - A condition or action that presents an immediate life-threatening or severe injury situation.

1.2 Contractor H&S Responsibilities

Contractors are responsible for establishing, implementing and maintaining their safety programs to meet the goals and objectives as stated by Freeport-McMoRan and for monitoring the programs of their subcontractors and suppliers to ensure compliance with Freeport-McMoRan expectations.

1.3 General Responsibilities

Prior to beginning work at the site, the contractor shall prepare and submit for review a site/task/project-specific safety plan that reflects the contractor's intentions for full and complete compliance with the applicable provisions of this manual pertaining to the scope of contracted work. (Note: Only those portions of this manual which apply directly to the work being done by a contractor is required to be included in the site-specific safety plan and which identifies safety risks and corresponding controls or management of those risks. The contractor's safety plan also must address any Freeport-McMoRan facility site-specific H&S provisions that exceed the requirements detailed in this manual. In addition, any Freeport-McMoRan site-specific H&S provisions applicable to the work being done that are not identified in this manual also will be included in the contractor's safety plan.

Contractors shall attend a project safety conference with the Freeport-McMoRan contract project manager, during which, the contractor's site-specific safety plan will be reviewed to ensure it meets all H&S expectations of Freeport-McMoRan, and is specific to the job or task being done. FCX will communicate to the contractor any site-specific details not addressed by the plan which must be addressed. Modifications to the safety plan will be finalized at this meeting. Subsequent amendments or changes to the plan must be submitted for review and approval before being implemented.

Each contractor shall provide, as a minimum, one full-time, qualified safety professional whenever the contractor's workforce meets or exceeds 50 employees. Additional full-time, competent safety professionals will be assigned to the project for each additional 250 employees. All contractor H&S professionals, through education, training and experience, must be capable of:

- Identifying existing or potential hazards, including unsafe acts, in the tasks being performed
- Identifying working conditions that are unsafe, hazardous or dangerous to the safety and health of employees and the environment
- Identifying any non-conformance with H&S rules and policies, including at-risk behavior
- Authorizing prompt action to maintain a healthy and safe work environment

The names and credentials of all contractor H&S professionals that will be assigned to the project shall be provided to the Freeport-McMoRan site H&S manager for review prior to initiating work on the contract.

1.3.1 Specific Requirements

Within 10 days after receipt of notification of the contract award, but prior to the start of work, the contractor must submit to the Freeport-McMoRan representative a letter signed by an officer of the company setting forth the following:

- A statement of the company's health and safety policy

All Contractors are also required to:

- Comply with national, regional, and local H&S laws and regulations, the Freeport-McMoRan Copper & Gold Contractor Safety Manual, and with any requirement imposed by the local Freeport-McMoRan operation where work is being conducted.
- Provide all contract personnel personal protective safety equipment for the work for which they are responsible, including safety glasses, hard hats, protective footing, fall protection and other safety clothing as required.
- Maintain the highest standards of housekeeping. Workplaces must be kept organized with all debris, waste materials, etc., cleared as work progresses.
- Play a full part in identifying and managing risk in the workplace since risk assessment is a key element in the Freeport-McMoRan H&S management system. Additional direction will be supplied by Freeport-McMoRan on-site personnel, including Hazard Identification and Risk Assessment (HIRA) tools.
- Verify that all contract employees have received project safety orientation as well as other training that is required specific to the job function being performed (i.e., lockout/tagout, confined space entry, working at heights, digging and excavation, etc.)
- Provide a disciplinary action policy, including exclusion from the site if necessary, for individuals who violate H&S procedures or drug and alcohol policies, or otherwise work in a careless or unsafe manner.
- Provide the first line response for first aid, emergency, fire, etc. Supplementary action, treatment and support will be provided by Freeport-McMoRan when required.
- Keep all registers, records and reports up to date and properly completed, stored in a safe place on-site, and maintained for review by legal or regulatory agencies.
- Stop all work in an area should an imminent danger condition be discovered, until appropriate and effective corrections are implemented. The contractor is responsible for ensuring that immediate action is taken to eliminate all unsafe acts and/or

conditions. If the contractor delays or refuses corrective action, Freeport-McMoRan may elect to do the following:

- Immediately cease operations
- Stop payment for the work being performed
- Correct the situation and back-charge the contractor for expenses incurred

Any contractor's manager, supervisor, owner or other person in charge that requires, condones, asks or allows employees to work in or around unsafe acts or conditions shall be immediately removed from the project site.

A management or supervisor level representative for each contractor shall attend periodic (as defined by the site) site safety meetings to which they have been notified.

1.3.2 Employees

No employee shall be required or knowingly be allowed to work in an unsafe environment.

Each employee is responsible for learning and abiding by those rules and regulations which are applicable to his or her work, and for reporting and correcting observed or anticipated hazards to his or her immediate supervisor.

The contractor is responsible to provide to each employee training on the project safety rules and precautions at their initial orientation which they will be held accountable for.

1.4 Insurance Carrier

Based on the nature of work and details of the contract, the on-site Freeport-McMoRan contracts administer may require each contractor and subcontractor to provide verification of insurance and experience modification details. Contractors are required to provide proof of insurance during the bidding phase of contract negotiations and maintain such coverage throughout the duration of the contract terms.

1.5 General Training Requirements

Each contractor is required to provide regular and continuing H&S training for all employees, and to monitor subcontractor training programs. Training is to include a site safety orientation as well as task-specific training as required by regulatory agencies or identified within the Freeport-McMoRan Contractor

Safety Manual. All training must be documented and a process implemented allowing a quick verification of training received by any individual. No individual will be allowed to work on a Freeport-McMoRan property who has not received required initial orientation safety training as required in this manual. Verification of training received must remain with each contract employee whenever on site and in contractor files. Specialty or regulatory compliance training shall be conducted by a competent person and shall be completed prior to the contractor's employee performing the task.

1.6 Health and Safety Meetings and Communication

All safety meetings will be documented. Record retention will be in accordance with the contract. Regularly scheduled safety meetings will be held on the site for all personnel. At a minimum, these will include:

- **Tailgate Safety Meetings**: Each supervisor will hold a safety/task training meeting in his or her work area, at least weekly. Subject matter will include specific safety procedures pertinent to the crew's activities, with emphasis on safe working procedures and potential hazards.
- **Monthly Supervisor Safety Meetings**: Each contractor will hold a monthly meeting for all supervisors and managers to review safety statistics and safety incidents, address safety concerns, and develop action plans to achieve project H&S goals and objectives. Action items shall be documented and tracked to completion. Freeport-McMoRan project manager representatives should be invited to these monthly meetings.
- **Safety Communications**: Each contractor shall be responsible for providing employees with pertinent information regarding health and safety as necessary with respect to: country-specific H&S regulatory information, company-specific safety information, awareness posters, communication of workplace incidents, etc. This can be accomplished through the use of strategically located employee communication bulletin boards.
- When a FCX contractor safety meeting is held, the contractor's management representative must attend.
- Man hours must be submitted by the 9th of each month.

1.7 Work Assignment

All work assignments, regardless of the level of activity, will include specific attention to safety. Employees must have immediate access to written safety procedures and/or guidelines pertinent to the work being conducted and material safety data sheets where chemicals or hazardous materials are

being used. Where verbal safety instructions are provided in lieu of written guidance, employees must be able to repeat safety instructions to demonstrate and acknowledge understanding of critical safety guidelines.

1.8 Permits and Inspections

The contractor is required to provide specific certifications and maintain required permits where periodic inspection is required for any mobile or temporary equipment or device. The project manager shall identify the certification and permits required for the project. Contractor permits/forms shall be reviewed by site health and safety. Examples of activities requiring permits include, but are not limited to: confined space entry, hot work, excavation, and rigging activities. Certification examples include, but are not limited to, crane operation, ATV operation, rigging, fork lift operation, and blasting.

1.9 Orientation

Newly employed, promoted, and/or transferred contract personnel who will be working on Freeport-McMoRan property shall be fully instructed in the safety practices required by their assignments. All employees will receive orientation prior to starting work. Visitors will receive orientation prior to leaving the office area or be escorted while on the site. Initial instructions for new site personnel will include discussion of the site's basic safety regulations. The initial safety orientation is to be performed under direction of Project Manager or the Contractor's qualified trainer as a part of the initial site orientation. Proof of such training must be documented.

At a minimum, the orientation should address, if applicable, the following:

- Site-specific hazards
- Incident reporting procedures
- Emergency evacuation procedures
- Reporting of unsafe acts or conditions
- How to obtain first aid
- Hazard communication standard requirements
- Blasting signals and response procedures
- Personal protective equipment requirements
- Identification of workplace hazards
- Drug and alcohol policy
- General safety rules and responsibilities/Codes of Safe Practice
- Fire protection and exit procedures for the work area
- Safety procedures unique to each job

- Haul road procedures
- Environmental procedures
- Working around heavy equipment

1.10 Reservation of Rights

Freeport-McMoRan reserves the right to add, interpret, change, revise or depart from any/all policies and procedures at any time, and to promulgate additional safety standards during the course of the project. Appropriate notice of change will be provided for immediate implementation.

2.0
Emergency Action and Medical Procedures

2.1 General Procedures

- In the event of a serious injury, trained contractor personnel should render first aid to any incident victims and shall immediately activate the site emergency response system. Contractor personnel shall immediately contact the Freeport-McMoRan Safety Department, their insurance company's safety professional, and the Freeport-McMoRan project manager. Freeport-McMoRan senior management will address any media inquiries or announcements and make other decisions critical to the overall site.
- Emergency telephone numbers shall be posted at all contractor telephones.
- Nothing is to be disturbed or removed after evacuation of the injured employee until a thorough investigation has been completed by all Government Agencies, and Freeport-McMoRan representatives. The area can only be released by the owner.

2.2 Incident Reporting

- All employees shall promptly report any incident (including near-misses), no matter how slight, to their supervisor. All incidents shall also be reported to the Freeport-McMoRan Safety Department immediately.
- Incidents of a serious nature may require "immediate" notification to state or federal agencies. It is the responsibility of each contractor to identify what constitutes "immediate" notification and who must be notified, and the time limits required (15 minutes in some cases with MSHA). It is required to notify Freeport-McMoRan representatives of such notifications to be made before notifying the agency.
- A completed "Incident Reporting Form" must be provided to the Freeport-McMoRan site Safety Department within 24 hours of all injuries, regardless of severity. Contractor needs to coordinate record information and details of an incident using the site Incident Report form. (Note: Some incidents at MSHA regulated properties require "immediate" notification to MSHA. Contractors are responsible for understanding these reporting requirements.)
- All incidents of a serious nature, including near-misses, shall be fully investigated to determine root cause. Actions plans will be developed and implemented to prevent re-occurrence. Investigations shall be fully documented and maintained on site for review.
- Failure to promptly report a workplace injury or illness may result in cancellation of the contract.

2.2.1 Monthly Frequency Report

- All contractors shall provide to the Freeport-McMoRan site Safety Department a monthly safety summary for results occurring on the project, which must include the following:
    - Number of lost time/restricted duty injuries
    - Number of medical treatment injuries
    - Number of occupational illnesses
    - Number of first aid injuries
    - Number of hours worked by contract personnel (Note: Hours and injuries reported are specific to the location where contract work is being completed).
    - Fire incidents
    - Vehicle equipment damages
    - Property damages
- Monthly summary reports will be due no later than the 6th of the following month (Note: These reports are to be site-specific, not company-wide data)

3.0
Roles and Responsibilities

3.1 General Duties

It is the policy of Freeport-McMoRan to provide a safe and healthful place of employment for all employees. Contractors have the obligation to:

- Abide by all federal, regional, local regulations and Freeport-McMoRan policies and procedures as they pertain to construction and other contract-related activities
- Protect the public from any and all hazards which result from contractor activities

3.2 Specific Expectations

To further these goals, the following assignments of responsibility are made:

3.2.1 Senior Management/Project Management

- Establish rules and programs designed to promote safety and make known to all employees the established rules and programs
- Hold individuals accountable for fulfilling their H&S responsibilities
- Make necessary training available for employees to perform their tasks safely
- Require all subcontractors, as a matter of contract, and all material suppliers, through purchase order terms. to follow their company safety rules, and those of Freeport-McMoRan
- Provide a safe and healthy work environment
- Conduct regular safety inspections of the job site, maintain records, and continually monitor the program for effectiveness

3.2.2 Project Supervision

- Ensure all work is done in compliance with established safety regulations
- Be completely responsible for on-the-job safety and health and ensure that safety deficiencies are corrected
- Monitor employee actions and behaviors
- Review and investigate incidents, supervise correction of unsafe practices, and file incident reports
- Conduct regular job-site safety meetings and provide employees with proper instruction on safety requirements
- Require conformance to safety standards from subcontractors
- Instruct new employees and existing employees performing new tasks on safe working practices

- Make sure personal protective equipment is available and used properly
- Secure prompt medical attention for any injured employees
- Ensure regular and thorough communication with FCX project manager

3.2.3 All Employees

- Report to work fit for duty, free from effects of alcohol and harmful drugs
- Work safely to ensure your own safety as well as that of co-workers and others
- Request help when unsure about how to perform any task safely
- Correct unsafe acts or conditions within the scope of the immediate work
- Report any uncorrected unsafe acts or conditions to the appropriate supervisor
- Use and maintain all safety devices as required
- Follow all safety rules and keep work areas clean and free of debris and obstacles
- If work cannot proceed safely, employees must notify their supervisor and stop work until the necessary steps have been taken to address and correct the hazards.

3.2.4 Subcontractors and Suppliers

- Abide by the safety rules, regulations and policies of all governing agencies and Freeport-McMoRan
- Check in with job-site supervision before entering the job-site
- Inform controlling contractor of all injuries to workers
- Report to controlling contractor any unsafe conditions that come to your attention
- Subcontractor/Supplier personnel (supervisors and hourly personnel) are responsible and accountable for their safety.

4.0
Assessments and Audits

Periodic documented H&S inspections of the project work areas are a key tool for quantifying H&S performance. These inspections are essential to identify deficiencies that need correcting, to identify and track trends, to evaluate the effectiveness of training and H&S procedures, and to ensure regulatory compliance.

Audits and inspections also should identify positive elements in H&S performance to help ensure a proactive element in building and maintaining a positive safety culture. Project workers should be given opportunities to become involved with these audits and inspections. The type of audit inspections required is listed below.

4.1 Daily Supervisory Audit

Each contractor supervisor (or his designee) shall conduct daily inspections of each work area to identify and control unsafe conditions and practices. Inspections shall be documented. Records shall be maintained for a minimum of one year unless a longer duration is required by regulatory authorities or site policies. Items of non-compliance will be listed on an audit registry and corrective action identified and tracked to completion.

Defects identified during the inspections shall be corrected prior to commencing work.

4.2 Weekly Self-Assessment Audit

Weekly self-assessment audits of all work areas will be conducted by the contractor to evaluate H&S performance. The contractor shall define an audit schedule and the areas to be inspected, and shall distribute the schedule to all inspectors.

Self-assessment audits will be conducted jointly with the affected line supervisor so any deficiencies may be corrected and good performance recognized promptly. Items of non-compliance will be listed on an audit registry and corrective actions will be tracked to completion. The contractor will summarize audit findings and provide to the project manager on a weekly basis. Audit findings also will be made available to Freeport-McMoRan H&S personnel to review on a periodic basis.

4.3 Monthly Project Audit

The project manager and contractor site manager shall jointly organize and perform a monthly documented site-wide H&S assessment. Area supervisors and safety professionals (contractor and FCX) should accompany them in their respective areas. Audit results will be documented, and corrective actions will be identified and tracked to completion.

4.4 Equipment and Facilities

All contractors shall operate, inspect and maintain equipment and facilities as directed by the criteria identified within this manual, and as dictated by the applicable federal, state and country safety and health regulations, and as recommended by equipment manufacturers. In the event of conflict, the more stringent requirement will take precedence.

Any equipment brought onto site which requires inspections (daily, monthly, annual, etc.) shall be accompanied by that documentation and it shall be made available for review on request. Equipment added or changed after the project has commenced shall be identified by the contractor and is subject to the same requirements.

Each operators of stationary and mobile equipment must complete a written pre-operation inspection of the equipment prior to operation. The inspection form must have room for operator comments, so that deficiencies can be reported. Items presenting an immediate safety hazard must be corrected before the piece of equipment is returned to service. The system must ensure both the prompt correction of any noted problem and proper documentation. Inspections must be maintained for a period of one year and all corrective actions must be noted on the inspection card(s).

4.5 External Audits

Freeport-McMoRan Health and Safety Professionals and/or Contract Administrators will perform periodic, comprehensive safety audits of the contractor's work areas. Any deficiencies will be documented. The contractor will be required to respond in writing within 72 hours on the corrective actions taken, and follow-up audits will be conducted as necessary.

5.0
Safe Practices

Freeport-McMoRan is committed to the philosophy of zero incidents, injuries, fatalities and occupational illnesses. Any number other than zero is simply not acceptable. This means integrating safety into all aspects of our work and taking this level of commitment beyond the workplace and into everything that we do at home and in our communities where we live.

5.1 Purpose

The purpose of these Safe Practices is to provide all employees with an awareness of workplace safety and how to ensure their safety and that of their co-workers. Each employee must understand those safety practices that are applicable to the tasks they are assigned, and abide by them. Lack of understanding or familiarity with safety rules is not an acceptable reason for a safety rule violation. Employees violating safety rules may be subject to disciplinary action up to and including permanent removal from all Freeport-McMoRan properties in accordance with the provisions of a management review. Contractor management is responsible for the enforcement of all rules.

5.2 Code of Conduct

All contract employees are responsible and accountable for working safely and productively, while remaining aware of the hazards of their jobs and following recognized safe job procedures. Specifically, employees will:

- Comply with all health and safety rules, departmental standard operating procedures, and regulations as outlined in this Code
- Report to work physically fit and mentally alert for duty
- Report any dangerous or potentially dangerous condition to supervision
- Stop any unsafe job or task immediately upon observing it and find a way to make it safe before continuing
- Not engage in horseplay
- Not use cell phones while operating mobile equipment or vehicles
- Not tamper with any emergency medical supplies or emergency vehicles
- Not interfere with any radio communications
- Not interfere or disable remote control, automatic equipment, safety interlocks or warning systems or guards that could contribute to a safety event
- Not tamper with the scene of a safety event
- Not engage in distracting activities while operating a company vehicle or a piece of equipment

5.3 Housekeeping

Work areas, passageways and stairs in and around the buildings and structures shall be kept clear of debris. Project materials shall be stored in an orderly manner. Storage areas and walkways on the site shall be maintained free of dangerous depressions, obstructions, trash and debris. Equipment/tools shall be stored or placed in an orderly manner.

5.4 Electrical Safety

- All temporary and permanent electrical work, installation, and wire capacities shall conform to the current National Electrical Code in addition to all applicable federal, regional, local codes.
- Only qualified electricians trained in electrical safety familiar with federal, regional, local codes and standards shall be allowed to perform electrical work, including repairs to electrical equipment.
- No employee shall be allowed to work close to unprotected electrical power circuits unless the area has been barricaded off or the employee is protected against electrical shock by de-energizing the circuit, grounding it, locking out and tagging the device, and protecting the individual by effective insulation or providing protection by other means.
- All switches shall be enclosed and grounded. Panel boards shall have provisions for closing and locking the main switch and fuse box compartment.
- Extension cords used with portable electric tools and appliances shall be heavy duty (no less than 12 gauge conductors), of the three wire grounding type, and conform to the type and configuration required by federal, regional, local electrical standards. No flat-type electrical cords will be allowed on-site.
- Suitable means shall be provided for identifying all electrical equipment and circuits, especially when two or more voltages are used on the same job. All circuits shall be marked for the voltage and the area of service they provide.
- Electrical cords and trailing cables shall be covered, elevated or otherwise protected from damage which could create a hazard to employees or other persons in the area. In areas where cables or cords enter or pass through walls, panels or boxes, appropriate bushings/sleeves shall be used. Electrical cords will be repaired with heat-shrink tape only, which is equal to or greater than the original insulation.
- Temporary lighting will be equipped with guards to protect the bulb and wiring and will be equipped with three-wire insulated cable.

- The use of extension cords shall be temporary and limited as much as possible.
- All electrical grounding systems (buildings, conveyors, portable generators, equipment, magazines, etc.) must be tested for continuity and resistance immediately after installation, repair and modification, and annually thereafter. Test documentation, with OHMS reading, must be kept on-site for review by compliance officers and safety personnel for one year.
- All electrical equipment (including hand tools and extension cords) must be visually inspected prior to use and monthly to ensure proper operation and free of electrical shock hazard. This shall be done by visual inspection, resistance and continuity checks. All inspections and checks must be documented and the equipment identified. Equipment with defects shall be removed from service until repaired.
- All temporary electrical tools and cords shall be properly protected by ground fault circuit interrupters (GFCI) throughout all phases of the project. This includes appliances such as refrigerators, microwaves, toasters, etc. Electrical equipment capable of holding a charge (such as capacitors or transformers) shall be de-energized and tested by a competent person to confirm an absence of residual charge.
- The following standards shall be referenced and followed. Federal, regional, and local standards shall be followed as minimally acceptable practices.
    - NEC and NFPA 10E (U.S., Mexico, Costa Rica, Venezuela, Columbia)
    - British Standards BS 76 6064/60298 (EU)
    - RGIE (Belgium)
    - NFC 15-100 (France for low voltage only)

5.5 Compressed Gas Cylinders

All compressed gas cylinders shall be clearly marked, with contents and hazard identified. Cylinders shall not be accepted on sites that are not properly labeled as to contents.

5.5.1 Cylinder Management

- When compressed gas cylinders are hoisted, they shall be secured on a cradle, cylinder truck, sling board or pallet.
- At no time may cylinders be hoisted with choker chains nor shall cylinders be hoisted by hooking or strapping onto the cylinder cap.

Cylinders shall be secured in a vertical position when moved with power vehicles.

- Regulators and gauges must be either protected from damage or dislocation with a cover/collar or be removed and cylinders capped whenever not in use or when the equipment is being moved. Never transport cylinders unless regulators have been removed. Cylinders shall not be rolled along the length of their axis.
- Cylinders shall be secured in an upright position, except when being hoisted or moved.
- Cylinders shall be placed where they cannot become part of an electrical circuit and shall be kept away from piping systems and layout tables that may be used for grounding electrical circuits.
- When in use, cylinders shall be placed with the valve up, and properly secured (to prevent them from being knocked over, tipping or falling over).
- Cylinders shall not be placed where they are, or can be, exposed to open flames, hot metal, or other sources of heat, including the sun.
- Cylinders containing acetylene, propane, butane, oxygen or inserts shall not be placed in confined areas or enclosed storage areas and shall be stored away from combustible/flammable materials. Cylinders shall not be stored, placed, or kept next to or adjacent to exits or in a manner that blocks or obstructs walk-ways or exits.
- A suitable cylinder truck with chain or other secure form of securing shall be used to keep cylinders from being knocked over while in use.
- Cylinders of oxygen shall not be stored close to cylinders of acetylene or other fuel gas (connection to hoses for standard use configuration is accepted). They shall be separated by a minimum of 20 feet or by a non-combustible barrier, at least five -5 feet high with at least a half-hour fire rating.
- Oxygen cylinders, cylinder valves, couplings, regulators, hose, and apparatus shall be kept free from oil and grease, since oil and grease in the presence of oxygen under pressure may ignite violently. Employees shall be prohibited from handling oxygen cylinders or apparatus with oily hands or gloves.
- Cylinders in storage should be kept away from sources of heat and shall always be shielded from the direct rays of the sun.
- Empty cylinders shall have their valves closed. Valve protection caps shall always be in place except where cylinders are in use or connected for use.
- Gauges shall be removed and bottles capped while being transported; this includes welding trucks and service vehicles.

- Compressed gas cylinders, empty or full, shall be secured in an upright position at all times except, if necessary, for short periods of time while cylinders are actually being hoisted or carried. Empty cylinders shall be marked “Empty.” If a cylinder is not equipped with a valve wheel, a key will be kept on the valve stem while in use.

5.6 Small Tools

5.6.1 Power, Air, Powder-Actuated and Hand Tools

- Power tools shall not be used if safety equipment,-such as shields, tool rests, hoods, and guards have been removed or otherwise rendered inoperative.
- Employees using tools under conditions that expose them to hazards of flying objects, harmful dusts, and/or noise shall be provided with the required personal protective equipment.
- All electrically powered tools shall be properly grounded. Outlets for 110-volt tools shall be protected by ground fault circuit interruption devices whenever used in outdoor or wet environments and an assured grounding program shall be utilized. Double-insulated electrical hand tools are recommended. Positive locking or trigger lock devices shall be removed. Doubly insulated power tools shall be inspected and maintained in a manner that preserves the insulating properties of the unit (buildup of dirt, dust or debris which may provide a pathway for current to flow is unacceptable).
- Gasoline- or diesel-powered tools shall not be used in unventilated areas. Gasoline and other flammable liquids shall be dispensed only from U.L. listed or equivalent metal safety cans. Cans are required to have a flash screen in place, with a self- relieving vent. Cans must be labeled by contents. Safety cans and drums shall be grounded when dispensing. Gas shall not be dispensed into cans when the can is in the back of a pickup. Cans must be placed on the ground when being filled with a flammable liquid.
- Portable grinders will be provided with hood-type guards with side enclosures that cover the spindle and at least 50% of the wheel. All wheels will be inspected regularly for signs of fracture and that wheels are rated for the grinder’s rpm.
- Bench grinders shall have deflector shields and side cover guards. Grinders shall have a maximum of 1/4-inch clearance to top of the guard, and tool rests shall have a maximum clearance of 1/8 inch from the wheel. Bench grinders must be secured to the bench to prevent displacement of the unit during use.

- Hoses supplying pneumatic tools shall have couplings secured to prevent accidental disconnection. “Push, twist, click” locking connection disconnects shall be used. Where those cam lock connectors are not used, a safety pin and whip check must be utilized.
- Air supply lines will be protected from damage, inspected regularly and maintained in good condition.
  Air sources supplying hoses exceeding 1/2-inch ID shall be protected by excess flow valves to prevent whipping in the event of hose separation or failure.
- The pressure of compressed air used for cleaning purposes will be reduced to 30 psi or less (this does not apply to cleaning of forms, etc.). Hose extensions always will be used. At no time shall compressed air be directed toward a person.

5.6.2 Powder-Actuated Tools

- Each powder-actuated tool operator must be certified in accordance with regulatory requirements. Only trained, certified employees shall be allowed to operate a powder-actuated tool. Employees shall wear double eye protection and hearing protection during use.
- Tools shall not be loaded until immediately before use, and loaded tools shall not be left unattended.
- Tools shall not be used in an explosive or flammable atmosphere. Cartridges (powder source) shall be separated from all other material.
- Powder-actuated tools used on this site shall meet all applicable requirements of regulatory requirements.
- Signs will be posted throughout the area, warning that powder-actuated tools are in use.
- All powder-actuated tools shall be of the low-velocity, cushioned-pistol grip, piston-type design.
- Loads, studs, nails, etc., used in powder-actuated tools shall be specifically approved by the manufacturer for use in that tool.
- Powder-actuated tools shall be designed so that discharging the powering load can be accomplished only when the barrel of the tool is firmly depressed against the working surface.
- All powder-actuated tools shall be U.L. and/or F.M. listed, or equivalent.
- Powder-actuated, piston-drive tools shall be designed so that the pistons always remain captive within the tool.

5.6.3 Condition of Use

In addition to the above requirements, the following conditions shall govern use:

- Ear muffs, plugs, or some equally substantial hearing protection shall be worn by any person within the confines of an enclosed area, up to 50 feet from the point of discharge and 25 feet in open outdoor locations.
- Impact-resistant face shields, or some other equally substantial protection, shall be worn in addition to safety glasses by each person within 25 feet of the point of discharge.
- Persons not directly involved with the operation of powder-actuated tools shall not remain in the usage areas unless all applicable provisions of personal protective equipment have been met.
- All misfired loads shall be disposed of immediately and safely, in a manner specifically approved by the manufacturer, contractor and owner.
- All loads, except while in actual use, shall be secured.

5.6.4 Maintenance

All maintenance work on powder-actuated tools shall be performed by competent and qualified technicians in accordance with the manufacturers' recommendations and using only exact replacement parts.

5.7 Welding, Cutting, and Burning

5.7.1 Hot Work Permit

- A hot work permit is required before working over or near oxidizers, flammable gasses, flammable liquids, oils rubber belting or lining, plastics, easily combustible materials, concentrate, coal, or hydrometallurgical piping, plants or operations.
- All sites have designated hot work permit required areas. It is the contractor's responsibility to become familiar with those specific areas at the worksite. Prior to any burning, grinding, cutting, welding, soldering, open flame or other operations capable of initiating fires or explosions, the contractor shall contact the client area supervisor to obtain permitting requirements.
- When not in use, welding gas hoses shall be bled to remove residual pressure.
- The Hot Work Permit will be issued only after each flame source has been checked to ensure proper procedures are planned and personal protective equipment is available and within reach.
- Each separate cutting and welding unit will be required to have, within 25 feet, a 20-poundABC fire extinguisher. A Fire Watch must be posted during the activities which generate heat, and for 30 minutes after to

ensure residual heat does not result in a fire. Where flammable or combustible is in the immediate vicinity of the hot work and cannot be moved, it shall be covered or protected from the heat source.

- All hoses shall be frequently inspected for leaks, worn places and loose connections. They shall be elevated or protected against damage and placed so as not to prevent the safe passage of workers and equipment.
- Approved flash arresters shall be provided on both oxygen and acetylene hoses in accordance with the manufacturer's recommendation. Placement is dependent upon the pressure of the gases -- at lower flow, the arrest device should be at the torch; at higher flow rates (greater than or = to 400 schf) the arrest device should be at the outlet of the regulator.
- Compressed gas cylinders shall be stored only in properly constructed storage racks, properly secured at all times, in properly ventilated areas.
- Welding current return circuits or grounds shall carry current without hot or sparking contacts and without passage of current through equipment or structures that might be damaged or made unsafe by the welding current or its voltage. Specifically, welding current must not be allowed to pass through any of the following materials:
    - Acetylene, fuel gas, oxygen or other compressed-gas cylinders
    - Tanks or containers used for gasoline, oil or other flammable or combustible material
    - Pipes carrying compressed air, steam, gasses or flammable or combustible liquids
    - Conduits carrying electrical conductors
    - Chains, wire ropes, metal hand railings or ladders, machines, shafts, bearings or weighing scales
- All arc welding and arc gouging operations shall be shielded by non-combustible, flame proof screens. NOTE: Air arc gouging has specific requirements for hearing protection. See site-specific procedures.
- The ground for the welding circuit shall be mechanically strong and electrically adequate for the service required.
- Electrode and ground cables shall be elevated and supported to prevent obstructions from interfering with the safe passage of workers and equipment.
- Where it is necessary to couple or uncouple several lengths of cable for use as a welding circuit, insulated cable connectors shall be used on both the ground line and the electrode holder line.

- An electrode holder of adequate rated current capacity shall be used, with enough insulation to protect the operator against possible shock and to prevent a short or flash when laid on grounded material.
- Cables with worn or damaged insulation shall not be used until properly repaired and insulated to the same or greater value as original insulation.
- All connection lugs on welding machines will be insulated.
- Only approved sparking strikers will be used to ignite flammable gas tools.
- If materials are to be covered or protected from welding slag or sparks, the contractor is to furnish fire resistant covers (non-asbestos).
- Welding on fall protection equipment, man lifts, and other such items require a certified welder.
- Cigarette smoking and use of lighters is prohibited within 50 feet of any hot work operations.

5.7.2 Personal Protection

Protective measures for welders and helpers are as follows:

- Hard hats shall be worn in conjunction with welding shields while welding. No soft caps are allowed. Safety glasses or goggles will be worn under the hood.
- Clothing will be free of oil, grease and other flammable material. Collars and cuffs will be buttoned and pant cuffs shall be turned inside pants. Pockets should be covered with flaps and buttoned or eliminated from the front of vests, shirts and aprons.
- All welders shall wear long-sleeve shirts, with the sleeve extended to the wrist (100% cotton clothing is recommended) and protective gloves with leather sleeves, or arm and shoulder covers, or welder's jackets. Cutters and helpers shall wear protective gloves and long sleeves. Pant legs are to be worn outside of the boots (not tucked in).Tape or other means will be used to ensure that hot slag does not get into the top of the welder's boot.
- Both welders and helpers will wear the proper filter lenses for the welding or cutting project undertaken.
- Face shields shall be worn along with approved safety glasses or goggles during grinding operations.
- No welding, burning or open flame work shall be performed on any staging suspended by means of fiber or synthetic rope.
- Either general mechanical or local exhaust ventilation, meeting applicable regulations, shall be provided whenever welding, cutting or

heating is performed in a confined or closed space. Adequate ventilation shall be provided or respiratory protection provided. All welders and cutters shall avoid the fume plume.

- An item being welded cut, or grinded should never be held in the hand. It should be placed on a sturdy support or clamped in a vise.
- Respirators with proper cartridges shall be used when welding or cutting on any galvanized, stainless, painted or coated metal or where other hazardous fumes, gasses or dust of metals may be emitted.
- All face shields and helmets shall be inspected prior to the task to ensure there are no cracks or evidence of damage.

5.8 Ladders

5.8.1 Manufactured Ladders

Manufactured ladders shall comply with the specifications of OSHA, or ANSI, or MSHA, or equivalent standards and job procedure.

- Damaged ladders shall not be used, and will be removed from the property or destroyed.
- All portable ladders shall be equipped with non-skid safety feet and shall be placed on a stable base. The access areas at the top and bottom of ladders shall be kept clear.
- The 4-foot fall protection procedure shall apply when working from ladders. All ladders shall be secured at the top with a rope or other substantial device. Where a tie off is not possible, a second person must hold the ladder until the work is completed and the worker has descended the ladder.
- Ladders shall not be painted except for identification marking.
- Ladders shall be maintained free of lines, ropes, hoses, wires, cables, oil, grease and debris. Objects shall not be left on ladders.
- If greater heights need to be reached, separate ladders will be used with intermediate landing platforms. Ladders shall be level; extension ladders shall be positioned in a 4:1 rise ratio; “A” frame or “step” ladders shall not be used unless fully opened.
- Maintain three points of contact at all times.
- Extension ladders shall extend 36 inches above the landings. When this is not practical, grab rails shall be installed. All ladders in use shall be tied, blocked, or otherwise secured to prevent accidental displacement.
- The use of ladders in the following manner is prohibited:
- Standing on the top two steps or top of ladders
- Sitting on the top of ladders

- Climbing or working from the back of ladders
- Two people on the same ladder
- Folding up and leaning stepladders
- Working backwards from ladders
- Straddling the top of the ladder, except on "A"-frame or special manufactured ladders
- Using folding ladders not fully opened
- Using extension ladders that have been separated
- Carrying materials up or down ladders
- Facing away from ladders while ascending or descending
- Ladders shall be visually inspected prior to each use. The ladder should be inspected by a competent person for visible defects on a periodic basis and after any occurrence that could affect the safe use of the ladder.
- Ladders shall be rated for the type of work and load expected (i.e. Type 1A 300-pound-rated fiberglass ladders)

5.8.2 Ladder Training Requirements

- The employer shall provide a training program for each employee using ladders. The program shall enable each employee to recognize hazards related to ladders and shall train them in the procedures to be followed to minimize these hazards.
- The employer shall ensure that each employee has been trained by a Competent Person in the following areas:
- The nature of fall hazards in the work area
- The proper construction, use, placement and care in handling of all ladders
- The maximum intended load-carrying capacities of ladders

5.9 Scaffolding

Use, assembly, and inspection of scaffolds shall follow the requirements of 29CFR1926 subpart L at a minimum, or the requirements of the local authority. http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10916

Scaffolds shall be designed, erected, moved, disassembled, altered and inspected by a Competent Person. To avoid the use of makeshift platforms, each application will be carefully planned to ensure that scaffolding is used where required and that such scaffolding conforms to the applicable

scaffolding erection requirements. A scaffolding permit shall be completed by the contractor, prior to use. A copy must be posted at the site.

- Lean-to scaffolds and makeshift platforms are prohibited.
- Scaffolds shall not be used for the storage of materials except material being currently used. Materials will be placed only over cross members. Scaffolding shall be kept clear of trash, oil and other debris.
- All scaffolds shall be adequately designed to carry, without failure, four times the maximum intended load. At no time shall a scaffold be overloaded.
- All scaffolds shall be maintained in safe condition. A scaffold damaged or weakened, from any cause, shall be immediately tagged and taken out of service until repaired.
- Scaffolding or work platforms more than 4 feet above the ground or floor, suspended from an overhead support or erected with stationary supports, shall have standard guardrails. Toe boards shall be installed where there is a danger to workers below Guardrail systems shall include 1) a top (hand) rail which is 2 inches x 4 inches (or equivalent), 42 inches high above the walking/working surface, and 2) a mid-rail positioned at 21 inches high, respectively, with supports not to exceed 8 feet between vertical supports, and 3) a toe-board shall be 4 inches high.
- Mobile scaffolding will be equipped with outriggers, and all casters will be locked. Mobile scaffolding will be guarded with standard railing regardless of height. No mobile scaffolding will be constructed or used where there is a change of elevation in the floor level.
- The site 4-foot, 100% fall protection requirements will be followed. Gaps or spaces on the work-side of the scaffold shall not create a fall or trip hazard; the walking/working surface shall be solidly planked and shall span the width of the scaffold frame unless workers use fall protection. Scaffold systems shall be held together with bolts, pins or other similar devices - rope or wire shall not be utilized.

While erecting and dismantling scaffolding:

- The footing of scaffolding must be sound and rigid, capable of supporting the weight. Unstable objects such as bricks or blocks shall not be used in the support.
- Screens shall be required between the toe-board and mid-rail where persons are required to pass underneath.
- The maximum span for 2-inch x 12-inch planks shall be 8 feet. Minimum plank dimensions shall not be less than 2-inch x 10-inch. Scaffold planks

shall extend over their end support at least 6 inches, but not more than 12 inches.

- All planking or platforms shall be fully decked. Ends shall be overlapped a minimum of 12-inches and secured from movement.
- Safe access (ladders) to upper levels of the scaffold will be installed as part of the assembly process. Stair towers shall be used, when physically possible, on stationary scaffolds 18 feet or higher. If not, rope grabs and lifelines shall be installed alongside the scaffold ladder.
- Protection shall be provided when there is exposure to overhead hazards.
- Wire or wire rope and synthetic or fiber rope used for scaffold suspensions shall be capable of supporting six times the intended load.
- Tubular-welded scaffolds shall be secured to the building or structure at intervals not to exceed 30 feet horizontally and 26 feet vertically. Scaffolds shall not be welded to tanks or other structures that could affect the integrity of the tank.
- Each scaffold shall be erected under the supervision of a Competent Person.
- A scaffolding inspection tag will be completed and attached to each scaffold prior to use.
- Scaffolds shall be inspected by the competent person at the start of each shift, and after the occurrence of any event which may affect the stability, integrity, or security of the system. The inspections shall be documented. A copy shall be affixed to the scaffold, and the original shall be maintained for one year.

A sample checklist is provided in the appendix.

5.10 Concrete, Concrete Forms and Pre-cast Concrete Materials

All equipment and materials used in concrete construction and masonry work shall meet the applicable regulatory requirements.

- Employees working more than 6 feet above adjacent working surfaces while placing reinforcing steel, setting or dismantling forms, etc., will use a safety harness with two lanyards/hooks. The standard of 100% fall-protection practices will be followed.
  NOTE: For MSHA regulated sites, employees working four or more feet above adjacent working surfaces are required to use fall protection.
- Employees shall not be allowed to work above vertically protruding reinforcing steel unless it has been protected to eliminate the hazard.
- The riding of concrete buckets for any purpose shall be prohibited. Working crews shall be kept out from under suspended concrete

buckets. Buckets shall have tag lines, which are a minimum of 6-feet long.

- Reinforcing mats used as a walkway shall be covered with plywood to provide safe footing.
- Workmen involved in abrasive blasting shall wear approved, properly functioning, supplied air respirators and hoods.
- Concrete workers will be required to wear appropriate shirts, boots, and gloves appropriately bloused or taped at the ankles and wrists to reduce the danger of burns.
- All lumber and materials shall be clear of nails and wire. Excess materials shall be removed from the immediate work area. During form stripping, all nails and snap ties will be pulled.
- All rebar with protruding ends shall have the ends protected.

5.11 Floor and Wall Openings

All conditions shall be controlled where there is danger of employees or materials falling through floor, wall or roof openings or holes, or where there is danger of employees or materials falling from the floor or roof perimeter edges or where a floor opening may cause a trip hazard. Flagging is not acceptable. A physical, rigid barricade or handrail with mid-rail and toe-board will protect floor and wall openings at all times. Holes must be suitably covered so as not to create a trip hazard, support weight placed on the cover, and which leaves no opening greater than 2 inches in the longest dimension.

5.11.1 Guarding

- Guarding and/or covers shall be removed only after other means of fall protection are in place. Employees installing and/or removing guarding and/or covers shall be protected by alternative fall protection through the entire process. The contractor responsible for the removal of guarding/covers is responsible for its replacement.
- The perimeter, floor and wall opening protection will include the installation of orange, 4-foot high vertical debris nets along with perimeter, floor and wall opening fall protection or an equivalent means to demarcate and identify the hazard. Vertical debris nets are required in lieu of toe-boards.
- No employee, regardless of position, craft or job assignment, shall be allowed in an area that could expose that person to a fall unless correct fall protection procedures are followed.

5.11.2 Standard Rails

- A standard railing shall consist of a top rail, intermediate (mid-rail) rail, 4-foot high vertical debris nets and posts (if toe boards are not present).
- The top rail shall be approximately 42 inches from the upper surface of the rail to the floor, platform or ramp level. The top rail shall be smooth-surfaced throughout its length and be made of at least 2-inch by 4-inch stock or 3/8-inch cable, triple-clamped wire rope and turnbuckles on all straight runs.
- The mid-rail shall be halfway between the top rail and the floor, runway, platform or ramp. The ends of the rail shall not overhang the terminal posts except when it does not constitute a projection hazard. The mid-rail shall be made of at least 2-inch by 4-inch stock or its equivalent (3/8-inch triple-cable clamped wire rope).
- The toe-board, with 4-inch minimum height, shall be securely fastened in place and have not more than 1/4 -inch gap between it and the floor level where vertical debris nets cannot be installed.
- Wood railing posts (verticals) shall be made of at least 2-inch by 4-inch stock or its equivalent and be spaced so as not to exceed 8 feet on center.
- Guardrail systems shall be capable of withstanding, without failure, a force of at least 200 pounds (890 N) applied within 2 inches (5.1cm) of the top edge, in any outward or downward direction, at any point along the top edge.
- Any welding must be inspected and approved by a certified welder.

5.11.3 Stair Railings

A stair railing shall be constructed similarly to a standard railing, but the vertical height shall not be more than 36 inches, nor shall there be less than 34 inches from the top rail to the surface tread in line with the face of the riser at the riser's forward edge. All handrails shall be provided with a minimum clearance of 3 inches between the handrail and any other surface or object.

5.11.4 Covered Floor Openings

Floor opening covers shall be capable of supporting five times the maximum intended load and shall be installed as to prevent accidental displacement. Covers shall be distinctively marked and anchored. All floor openings shall be protected by a cover or standard railing with vertical 4-foot-high debris nets.

5.11.5 Procedures during Project Activity

- During the project, stairs shall be provided on all structures exceeding one story in height. Stairways shall be equipped with guardrail systems on leading edges. The guardrails may be temporary in nature so long as they comply with dimensional and strength requirements noted in 5.11.2, above.
- All parts of stairways shall be free of hazardous projections. Debris and other loose material shall not be allowed to accumulate on or under stairways. No flammable or combustible material may be allowed to be stored or accumulate under or beneath any stairway.
- Permanent steel stairways having hollow pan-type treads and landings that are to be used prior to concrete placement shall have the pans filled with solid material to the level of the nosing.
- Temporary stairs shall have a landing not less than 30 inches wide, in the direction of travel, for every 12 feet of vertical rise. Wooden treads for temporary service shall be full width.
- Riser height and tread width shall be uniform throughout any flight of stairs.
- Steps are required when a vertical step height is 20 inches or greater.

5.11.6 Runways and Openings

- Wall openings from which there is a drop shall be physically guarded. Flagging is not acceptable.
- Runways shall be guarded by a standard railing, or the equivalent, on all open sides 19 inches or more above the floor or ground level. Whenever tools, machine parts, or materials are likely to be used on the runway, a toe-board shall also be provided on each exposed side.
- Regardless of height, open side floors, walkways, platforms, or runways above or adjacent to dangerous equipment and similar hazards shall be guarded with a standard railing and 4-foot-high debris net.

5.12 Fall Protection Requirements

Please refer to the Appendix and the Fall Protection SOP. An electronic version can be accessed at:
http://fmweb/sites/HSPro/Policies%20%20Guidelines/Fall%20Protection%20Guidelines.pdf

5.13 Steel Erection

5.13.1 Permanent Flooring

Permanent floors shall be installed as soon as practical following the erection of structural members. At no time shall there be more than four floors, or 48 feet, of unfinished bolting or welding above the foundation or uppermost-secured floor.

5.13.2 Temporary Flooring

- The erection floor shall be solidly planked over its entire surface except for access openings which shall be properly and appropriately guarded at all times.
- Planking shall not be less than 2 inches thick, full size undressed, and shall be laid tight and secured against movement. Access openings will be guarded with standard guardrail.
- A safety railing shall be installed, approximately 42 inches high, around the periphery of all temporary planked or decked floors during structural steel erection. This railing shall be at least 3/8-inch cable with at least three cable clamps at each connection with turnbuckles installed in all continuous runs.

5.13.3 General Requirements

- When structural steel is set, each piece shall be secured with not less than two bolts at each connection and drawn up wrench-tight before the load is released.
- Material shall not be hoisted to a structure unless it is ready to be put into place and secured.
- At no time shall an employee be exposed to the potential of a fall exceeding 4 feet without required fall protection. Appropriate work platforms with proper guardrails, static lines, or the use of safety nets, which remove such fall exposure, shall be considered adequate. Outrigger nets are required when nets are used.
- When loads are being hoisted, walking under the lift or allowing an employee to be exposed to the swing of the lift is prohibited. No one shall be allowed to ride the load under any circumstances.
- A tag line shall be used to control all loads.
- For the protection of other crafts on the project, barricades and signs shall be posted around the erection area, stating: “Danger Overhead Work in Progress.”
- There will be no “multi-tiering” of loads (Christmas Treeing).

5.14 Excavation and Trenching

5.14.1 Excavation Permits

- An excavation permit is required for any excavation (digging, trenching or drilling). Permits must be completed prior to beginning excavation. The contractor in charge of the work will:
    - Require that all trenches and excavations over 4 feet deep be sloped, shored, benched, braced, or otherwise supported. Contractors also may use a trench box. When soil conditions are unstable, excavations shallower than 4 feet shall be sloped, supported, or shored.
    - Initiate the excavation permit following site-specific requirements and forward the completed form to the project engineer
    - Ensure that all approval signatures required on the permit are obtained after the individuals have reviewed the field drawing
    - Present the completed excavation permit to the machine operator. Identify by name, the on-site Competent Person for the excavation(s).
- The determination and design of the supporting system shall be based on careful consideration of the following: depth of the cut; anticipated changes in the soil due to air, sun and water; and ground movement caused by vehicle vibration or blasting, and earth pressures (not only the angle of repose).
- The machine or equipment operator will not begin excavation until the permit, signed by all required personnel, is present at the excavation site.
- The competent person shall classify the soils of an excavation as “A”, “B”, or “C” and shall determine safety measures and recommendations appropriate for the soil classification.
- The excavation permit will remain at the site of the excavation during the entire time the excavation is being accomplished.
- When the excavation operation has been completed, the excavation permit will be filed by the contractor.

5.14.2 Underground Utility Location (Blue Stake)

The contractor shall identify and locate all sub-surface utility and process or product lines prior to making any cut into the ground. This shall be coordinated through both the utility owner and the on-site resources.

5.14.3 Designing Adequate Protection

Some of the considerations the contractor must take into account in the design of adequate protection are:

- Soil structure
- Depth of cut
- Water content of soil
- Changes due to weather and climate
- Superimposed loads
- Vibrations
- Other operations in the vicinity
- Overhead power lines
- Underground obstructions
- The presence of underground utilities, product or process lines.
- The presence of "disturbed" soils (either fill material or due to previous excavation activity)
- Air quality

5.14.3 Installing the Protection

- Regardless of the support system used, workers shall always install shoring, starting from the top of the trench or excavation and working down. Shoring must be installed correctly. Installation of shoring shall closely follow the excavation work.
- All materials used for shoring shall be in good condition, free of defects and of the right size.
- Note: One method of ensuring the safety of workers in a trench or excavation is to slope the sides of the cut to the angle of repose, the angle closest to the perpendicular at which the soil will remain at rest.

5.14.4 Special Precautions

- Underground utilities (gas lines, electric lines, communication lines, process lines, etc.) shall be located and identified prior to any excavation. As the anticipated location of the utility is approached, manual means of excavation shall be used to determine the final, actual location of the utility. The location of the lines may be through a commercial service (may be known as "Blue Stake" or by contact with the utility owning the lines, or through site planning or facilities departments. In the case of work being performed within a building or structure, any penetration of a wall or floor must follow a similar process in terms of locating and approaching the hidden utility.

- The contractor shall guard against an unstable excavation bottom, such as below the water line. Sheeting may have to be driven below the bottom of such an excavation to add to the soil stability.
- Standards require that diversion dikes and ditches, or other suitable means, be used to prevent surface water from entering an excavation and to provide adequate drainage of the area adjacent to the excavation. Water causes erosion and softening and shall not be allowed to accumulate in a trench or excavation.
- In excavations that employees may be required to enter, excavated or other material shall be removed or sufficiency retained. Spoil piles, loose materials and equipment shall be kept at least 3 feet or more from the edge of the excavation. The sides of the excavation shall be secured by fencing or other effective means to prevent a passer-by from falling into the excavation during times when no active excavation is occurring.
- Where passage across the opening of the excavation is necessary, a properly secured and guarded walking surface shall be installed.
- No persons shall be allowed to be beneath any live load while the load is being placed into or removed from the excavation.
- In case of emergency, workers must be able to leave the trench quickly. When employees are required to be in trenches 4 feet deep or more, adequate means of exit, such as ladders or steps, shall be provided and located so as to require no more than 25 feet of lateral travel. Ladder will be of proper type, adequate length and secured from movement.
- Underground utilities shall be located, and provisions made for their protection.
- Excavations which are at or greater than 20 feet deep shall be designed by a professional engineer, and the plans for the excavation shall be kept at the excavation site. The design shall specifically include protection features if persons must enter the excavation for any reason for any length of time.

5.14.6 Inspections

Excavations and shoring systems must be inspected daily and after each event or occurrence which may affect the integrity or stability of the excavation, such as rainfall, vibration caused by passage of equipment or mine blasting, etc. by a Competent Person. Inspections shall be documented and made available for review.

5.14.7 After the Work is Complete

As soon as work is completed, backfilling shall take place as the shoring is dismantled. Workers shall remove the shoring from the bottom up, taking care to release jacks or braces slowly. In unstable soil, ropes will be used to pull out the jacks or braces from above.

5.14.8 Drilling Operations

- The owner will authorize an excavation permit prior to any excavation, digging, trenching or drilling operations.
- The drilling area shall be inspected for hazards before starting the drilling operation.
- Drill crews and other employees shall be directed to stay clear of augers or drill stems that are in motion.
- When drill helpers assist the drill operator during installation or operation of a drilling rig, the helpers shall be in sight of, or in communication with, the operator at all times.
- While in operation, drilling rigs shall be attended at all times.
- Drill steel, spare parts and tools shall be safely stored in racks or receptacles on the drill rig when not in use.
- Employees shall not drill from positions that hinder their access to the controls or from insecure footing or staging.
- Drilling equipment shall be inspected at the start of each shift by a Competent Person and any defects noted shall be corrected before the equipment is used.
- Before each drilling cycle is started, warnings shall be given to workers in the area around the drilling operation.
- During a lightning storm, the site-specific procedures for evacuation and safety must be followed.
- Respirators are required for Dry Drilling operations.

5.15 Personal Protective Equipment (PPE)

All contractors are responsible for providing and ensuring use of the required personal protection equipment. Each work area will be reviewed as to the hazards present, and appropriate PPE to control these hazards will be provided. Wearing jewelry is not recommended within maintenance shops and any other areas where moving parts or equipment is located and/or where chemicals are being used. Consult site safety practices for guidance. This section establishes the minimum requirements of personal protective equipment to be used. As applicable, equipment complying with OSHA/MSHA/NIOSH/ANSI criteria shall be used.

5.15.1 Head Protection

- The wearing of approved, non-conductive, safety hats, classes B or E or above, is mandatory in all project areas 100% of the time. Refer to ANSI Z89.1, "Safety Requirements for Industrial Head Protection." Aluminum hard hats are not allowed.
- All PPE shall be visually inspected by the employee before use and after each hazard increasing event which may have adversely affected the PPE.

5.15.2 Eye and Face Protection

- Safety glasses with side shields will be provided by the contractor and are mandatory at all times. Mirrored and dark safety lenses are prohibited indoors.
- All work areas require 100% eye protection 100% of the time. Minimum eye protection includes approved safety glasses with side shields or mono-goggles meeting the standards specified in ANSI Z87.1-1968, or equivalent international standard, “Practice for Occupational and Educational Eye and Face Protection.” The contractor shall ensure that the protective equipment is adequate and effective for the hazard(s) present--for example, a splash shield is not the same as an impact-resistant shield.
    - Additional eye and face protection shall be worn by employees when:
    - Welding, burning or cutting with torches
    - Using abrasive wheels, grinders or files
    - Chipping concrete, stone or metal
    - Working with any materials subject to scaling, flaking or chipping
    - Drilling or working under dusty conditions
    - Abrasive or water blasting
    - Waterproofing
    - Working on energized switchboards
    - Using explosive-actuated fastening or nailing tools
    - Working with compressed air or other gases
    - Working with chemicals or other hazardous materials
    - Working near any of the operations listed above

5.15.3 Respiratory Protection

These following practices detail requirements for respirator use to protect workers against the inhalation of harmful air contaminates in the workplace:

- Development of a written respiratory protection policy for the selection and use of respirators that specifies which respirator to use under specific conditions
- Development and implementation of procedures for medical evaluation of each worker required to use respiratory equipment (Note: Medical clearance is required prior to respirator use). An implemented respirator fit test program which is done at the time a respirator is issued to a worker, and annually thereafter for all "tight fitting" respirators. NOTE: each worker who will wear a tight fitting respirator must have proof of medical clearance and documentation for their fit test which identifies the make, model, and size of respirator before being allowed to work in areas where respiratory protection is required.
- Development and implementation of initial and annual training for workers on the proper use and limitations of respirators to be used for routine or emergency work, with training including respirator selection, functions and limitations of individual respirator types
- Development of fit-check procedures to be taught to each individual required to wear a respirator
- Development of procedures and schedules for cleaning, disinfecting, storing, inspecting, repairing, discarding and otherwise maintaining respirators
- Identification of, and communication on, workplace areas and job-specific tasks requiring respiratory protection to all employees
- Establishment of procedural systems to ensure proper respirator usage is adhered to at all times, including policy of clean shaven faces to ensure proper seal of respirator to face piece.

5.15.4 Hearing Conservation

The criteria and requirements for occupational noise exposures are contained in FCX policy. Employee hearing will be protected in accordance with this procedure and accepted hearing conservation measures. The hearing conservation program will include:

- A written hearing conservation plan
- Conducting a determination of job assignments that could expose a worker to noise levels above 85 dBA over an 8-hour Time Weighted Average (TWA), with hearing protection required wherever 85 dBA is exceeded. Note that double hearing protection is required to be provided to workers who are exposed to noise levels at or above 105 dB.
- Implementing feasible engineering and administrative controls to reduce employee exposures to 85 dBA or less

- Training on the effects of noise exposure and the proper use of earplugs and earmuffs
- Provisions for, and enforcement of, the use of adequate earplugs or earmuffs for employees who work in areas exceeding 85 dBA. Pre-exposure baseline and annual audiometric hearing tests for all workers exposed to noise at or above 85 decibels (dB) as a Time Weighted Average (TWA) of 8 hours.

5.15.5 Safety Shoes

Steel-toed leather work boots/shoes that meet ANSI Z-41 standard, or equivalent international standard, are required. Bare feet, tennis shoes, sandals, Docksiders, Hush Puppies or other footwear that doesn't meet the standard of steel-toed work boots are prohibited. Metatarsal protection shall be worn for certain operations, specifically when operating tamping equipment and where employees handle or carry heavy tools or objects.

5.15.6 Gloves and Hand Protection

Appropriate gloves shall be provided and worn when handling hazardous objects or substances that could cut, tear, burn, be absorbed through the skin or otherwise injure the hands or health of workers.

5.15.7 Other Personal Protective Equipment

Other required equipment to be used under unusual circumstances such as high temperature work, handling corrosive liquids, etc., not specifically covered in this section shall be reviewed by the contractor and will be furnished by the contractor when required.

5.15.8 Maintenance

Personal protective equipment shall be destroyed if it has been altered in any manner so as to reduce its effectiveness.

5.16 Fire Protection

Fire safety shall be a key component of the contractor safety plan. Requirements include:

- The operation and maintenance of temporary heating equipment shall create no fire hazards. The use of solid fuel salamanders shall be prohibited. Clothing may not be dried by placing it on or near heaters. Only smokeless fuels shall be used for heating purposes.
- All flammable and combustible materials shall be stored and handled with due regard to their fire characteristics. Flammable liquids shall be stored in an approved manner and dispensed only in approved self-

venting metal safety containers with flash screen. All containers must be labeled with the name of the contents and with the hazard class. Welding gases shall be stored in isolated areas and segregated by type of gas. Lumber shall be stored as far as possible from any source of ignition. Grounding shall be installed for storage tanks or skids. Where equipment is refueled at storage tanks or skids, bonding straps shall be provided, and the equipment and the fuel tank shall be physically bonded during the refuel process.

- Access to the work area and its perimeter shall be maintained for use by heavy fire-fighting equipment.
- Open fires or sources of ignition shall not be allowed within 50 feet of the storage or use locations of flammable or combustible materials.
- All heaters shall be in proper working order, supervised by properly trained personnel, and UL-listed or equivalent. A tip-over shut-off device shall be included for space heating equipment.
- All electric power tools, devices (portable heaters), etc. , shall be inspected prior to use on site to include insulation, grounding, plugs, casings, etc., and shall be marked according to site protocols to indicate a current inspection for safe use unless equipped with GFCI.
- Fire protection equipment will be provided in all areas where combustible materials are present. Only trained personnel will be allowed to use fire protection equipment if the need arises.
- Temporary fire fighting or fire protection equipment shall be replaced immediately after use and shall be removed upon completion of the project.
- Fire extinguishers will be visually inspected and documented monthly. Defective units are to be taken out of service. A current inspection tag will be displayed on each extinguisher. Each extinguisher will have an annual inspection and certification by a qualified individual.

5.16.1 Specific Fire Prevention Guidelines

- Smoking or open flames are prohibited in locations where flammable or combustible materials are stored, such as paint shops, fuel stations, carpenter shops, fuel trucks and other restricted areas. “No Smoking or Open Flames within 50 feet” signs will be posted in these areas, visible from all sides and within 100 feet where flammable materials are dispensed.

  Flammable and combustible materials will be separately and properly stored in approved safety containers. All such storage containers will be clearly identified with proper labeling.
- Refueling of gasoline or liquid propane equipment while the motor is running is prohibited. Bonding cables will be used during refueling.

- Safety waste cans with lids shall be provided for disposal of oily rags or other combustible materials.
- All welding and cutting operations shall have fire extinguishers in the immediate area and shall be continually watched during and for 30 minutes after, the completion of the task. Incompatible materials shall not be stored in proximity. The degree of separation must be sufficient to prevent contact with each other under spill or release conditions.
- The contractor shall determine the need to have and use intrinsically safe tools, equipment, or devices where they may serve as a source of ignition for flammable or combustible materials. Conditions evaluated should include both normal and non-normal situations.

5.16.2 Use of Temporary Portable Atmospheric Pressure Fuel Tanks

It is required that all contractors comply with the following specifications for tank construction and design when using this equipment.

- Metal tanks must be UL-approved, or equivalent, by a recognized agency as a flammable liquid storage tank and meet requirements of NFPA, or equivalent, The Flammable Liquids Code. Key provisions of this code include:
  - Tank Size: Minimum 61 gallons, maximum 600 gallons.
  - Vents:
    - At least one vent having a minimum size of 1-1/4 inch inside diameter is required.
    - The automatic vent shall be set to open at 5 psi and have the capacity of limiting internal tank pressure to 10 psi.
- Outlet Valves, Nozzles, Hoses:
  - Outlet valves, nozzles and hoses must be UL-listed, or equivalent, and of the automatic self-closing nozzle type that can be padlocked to its hanger to prevent tampering.
  - A bottom draw-off gravity flow tank shall be equipped with a valve located on the tank discharge pipe ahead of the hose (preferably fusible link valve).
  - A top dispensing tank shall be equipped with a UL-listed, or equivalent, anti-siphoning pump.
- Grounding and Bonding: The tank shall be grounded by a metallic grounding cable with an electric resistance not to exceed 1,000,000 ohms. It must be permanently bonded.
- Top dispensing tanks shall be mounted at least 6 inches above the ground.

- Bottom gravity flow tank supports shall be made of steel and have a maximum height of 7 feet.
- Labeling: All tanks shall be properly labeled to identify the contents and hazard class.
- Tanks shall be located at a minimum distance of 50 feet from any facilities, major equipment or other materials.
- Diking:
    - The capacity of the diked area shall not be less than the capacity of the largest tank.
    - The minimum distance between the tank and toe of the dike shall be 5 feet.
    - Storage of combustible materials, empty or full drums or barrels, in the diked area, is prohibited.
    - Dike shall be of sufficient size to contain 125% of the capacity of largest tank, and dike shall be lined with impermeable material.
    - Note: Double-walled tanks do not require diking.
- The fuel tanks may not be located under power lines.
- Electrical equipment within 20 feet of dispensing locations shall be rated as a NFPA/NEC Class I, Group D location, or equivalent.
- "No Smoking" or "Open Flame" signs must be displayed within 50 feet of the area.
- At a minimum, one 20-pound ABC fire extinguisher shall be provided within 25 feet of the storage tank. They shall be protected from weather, mounted and labeled.
- The storage vessels shall be protected from being hit, struck, or tipped over by barricades, balusters or similar sturdy devices.

5.17 Crane Safety

- All cranes and cable (wire rope) rigged hoisting equipment shall have a current annual certification by an accredited third party. This shall be done prior to working and shall maintain a current annual inspection for the duration of the work.
- Worn or damaged wire rope shall be a cause for taking the equipment out of service being replaced.
- Belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains, or other reciprocating, rotating, or other moving parts or equipment shall be guarded if such parts are exposed to contact by employees or otherwise create a hazard. Guarding shall meet the regulatory or recognized national standard.
- Contractors shall maintain on-site documentation of an annual certification for each crane and associated rigging equipment

brought onto the site. Certification must be kept current; re-certification will occur if the crane is damaged or the 12-month certification period is exceeded.

- The crane's operator, or other Competent Person, shall conduct a daily inspection of the crane, prior to use, to ensure that the crane is safe for operation. This inspection shall be documented and available for examination at any time.
- Under no circumstances will anyone be allowed to ride the suspended load, hook or ball.
- Under no circumstances will anyone be allowed to conduct work, or walk, beneath a suspended load.

5.17.1 Mobile Crane - Crane Setup

The operator shall be responsible for:

- Proper placement of the crane in relationship to the load to be handled and the landing area so as to obtain the best rated lift capacity
- Proper placement and use of outriggers for all lifts except where the manufacturer allows otherwise
- Determining the stability of the ground or footing
- The installation and maintenance of crane swing radius protection
- Anti-two-block devices are required on all cranes
- The installation of a boom angle indicator on cranes that is readily visible to the operator

5.17.2 Load Ratings Determination

- The weight of all auxiliary handling devices such as hoist blocks, headaches balls, hooks and rigging shall be considered as part of the total load, in addition to the weight of all items added at the site.
- The operator shall be provided with a copy of the bill of lading with the item weight clearly legible. No crane will be loaded beyond its rated capacity or used for other than its designated purpose.
- A legible capacity chart specific for each individual crane, and easily visible to the operator, shall be located in the crane during operation.

5.17.3 Crane Inspection

- Cranes shall be inspected after setup, prior to the initial lift and before each shift.
- Daily crane inspections will be performed and documented in writing to check the following by each operator:
    - All control mechanisms for maladjustment, excessive wear or contamination

- All safety devices
- Deterioration of air-hydraulic systems
- Crane hooks, chokers and slings for damage
- Electrical apparatus for malfunctioning, signs of excess wear, dirt and moisture accumulation

5.17.4 Recordkeeping for Cranes

- All inspections shall be documented and maintained on-site, available for inspection and review.

5.17.5 Crane Maintenance

- All maintenance will be performed in accordance with manufacturer's recommendations.

5.17.6 Crane Setup Ground Stability

For maximum capacity, the crane must be level, and the ground surface must be adequate to support the dynamic load of a working crane.

5.17.7 Calculating Load-Bearing Pressures

Only knowledgeable and certified crane operators will calculate load-bearing pressures. Crane usage beyond rated load-bearing pressures is not allowed.

5.17.8 Soil Stability

Different type soils will give different load-bearing pressure. When setting up a crane, the qualified person must be able to distinguish between the three groups of soil, the appropriate mixture of each, their moisture content and their depth. Factors such as water tables and distance to excavation that affect the soil's ability to withstand the pressure without collapsing also must be considered by the qualified person.

5.17.9 Mobile Crane

5.17.9.1 Operator Qualifications

- Crane operators shall comply with site requirements to operate a crane.
- Crane operators who possess a nationally recognized license or certificate will be required to provide evidence of their training, qualifications and competence prior to arrival on site. In any case, the operator shall have a current, applicable written documentation of training for the category of equipment being operated.

- Crane operators shall document a recent physical examination, including a vision test, prior to applying for a project crane operator license. (Note: The D.O.T. Physical forms meet the above requirements and may be used as a guideline.)
- In order to receive a project crane operator license, an applicant must be able to pass a written test that includes, at minimum, the following elements:
    - Crane Set-up
    - Reading Load Charts
    - Calculating capacities at a given radius
    - Calculating deductions for rigging, block, jib, etc.
    - Proper Crane Operation
    - Rigging and Rigging Inspection
    - Evaluating Site Conditions
    - Pre-Operations Inspection
- Potential candidates for crane operator shall be able to pass a "hands on" test that includes the following skills:
    - Perform Pre-Operation inspection
    - Set crane up for a lift
    - Inspect rigging
    - Operate crane and show ability to follow hand signals (i.e., swing boom, place hook, etc.)
    - Ability to read load chart and calculate load
    - Perform a test lift
    - The "hands on" test shall be documented and results made available upon request.

5.17.9.2 Operating Procedures

- The operator shall not engage in any practice that may divert his or her attention while engaged in crane operations, and will never leave the controls when there is a load on the hook.
- The operator shall not operate the crane if physically or mentally unfit, or if taking prescription drugs which may affect judgment.
- The operator shall not respond to any signal that is unclear or is given by anyone other than the appointed signal person (with the exception of a stop signal given by anyone).
- The operator shall have final responsibility and control over the crane operations. When there is any doubt as to safety, the operator shall have the authority to stop and refuse to handle the loads until safety has been assured. Any manager,

supervisor or person attempting to bypass the crane operator's authority on this issue will be removed immediately from the site.

- The load shall be attached to the hook by means of slings or other approved devices, and no open hooks shall be used. Hooks shall have functional safety latches.
- A shackle shall be used to retain two or more choker eyes in the hook where the hook is not so designed to attach multiple rigging components.
- Hooks shall not be changed, defaced or deformed in any manner. Hooks that have been exposed to excessive heat such as welding, burning, grinding, etc. will not be allowed on-site.
- The operator shall position the hook over the load in a manner to prevent load swing.
- The operator shall determine that the rope is properly seated in the drum and in the sheaves; the load line is not kinked; and multiple part lines are not twisted around each other.
- Shake out hooks will be used only for shaking out materials.
- During hoisting, the operator shall not suddenly accelerate/decelerate a moving load; allow the load to contact any obstructions; swing loads over personnel; or allow side loading or load dragging.
- All load rigging equipment shall be appropriately rated. Ratings shall be displayed on the device.

5.17.9.3 Rigging Requirements

- Rigging will only be completed by competent individuals who have received training on proper rigging techniques. Evidence of such training must remain with riggers during working hours.
- All rigging equipment shall be inspected prior to each use. Damaged or defective slings shall be immediately removed from service and destroyed.
- "Shop-made" grabs, hooks, clamps or other lifting devices are prohibited.
- All rigging equipment shall have a safety factor of five.

5.17.9.4 Safe Operating Practices

- Slings shall not be shortened by knots, bolts or other makeshift devices.
- Wire rope slings shall be padded or softeners used to protect against damage due to sharp corners.
- Slings used in a basket hitch shall have the loads balanced to prevent slippage.

- Loads handled by slings shall be landed on cribbing or dunnage so that slings will not be pulled from under or be crushed by the load.
- Slings subjected to shock loading shall be immediately removed from use and destroyed.
- Tag lines will be used with all lifting operations.
- Repair to rigging equipment is prohibited. It shall be removed from service and destroyed or sent to the manufacturer for repair.

5.17.9.5 Inspections and Recordkeeping

- A thorough written inspection of slings, ropes and chains in use shall be made on a regular basis, but not less frequently than six months.
- A record of inspections shall be maintained.

5.17.9.6 Work Platforms suspended from Cranes

- A permit is required prior to using a crane for lifting personnel in a suspended platform. The platform must be certified by a professional engineer. The permit will be issued by the contractor when it is determined that the use of the platform is the only feasible method of accomplishing the task. The safety checklist included with the permit will be utilized prior to hoisting personnel. A pre-lift meeting must take place prior to the lift and be documented. Fall protection must be in place according to regulatory and FCX Fall Protection standards. Personnel and materials cannot be lifted together.

5.17.10 Fixed (non-mobile) Cranes

5.17.10.1 Operator Qualifications

- Crane operators shall comply with site requirements to operate a crane.
- Crane operators who possess a nationally recognized license or certificate will be required to provide evidence of their training, qualifications and competence prior to arrival on site. In any case, the operator shall have a current, applicable written documentation of training for the category of equipment being operated.
- Crane operators shall document a recent physical examination, including a vision test, prior to applying for a project crane operator license. (Note: The D.O.T. Physical forms meet the above requirements and may be used as a guideline.)

- In order to receive a project crane operator license, an applicant must be able to pass a written test that includes, at minimum, the following elements:
    - Crane Set-up
    - Reading Load Charts
    - Calculating capacities at a given radius
    - Calculating deductions for rigging, block, jib, etc.
    - Proper Crane Operation
    - Rigging and Rigging Inspection
    - Evaluating Site Conditions
    - Pre-Operations Inspection
- Potential candidates for crane operator shall be able to pass a "hands on" test that includes the following skills:
    - Perform Pre-Operation inspection
    - Set crane up for a lift
    - Inspect rigging
    - Operate crane and show ability to follow hand signals (i.e., swing boom, place hook, etc.)
    - Ability to read load chart and calculate load
    - Perform a test lift
- The "hands on" test shall be documented and results made available upon request.

5.17.10.2 Operating Procedures

- The operator shall not engage in any practice that may divert his or her attention while engaged in crane operations, and will never leave the controls when there is a load on the hook.
- The operator shall not operate the crane if physically or mentally unfit, or if taking prescription drugs which may affect judgment.
- The operator shall not respond to any signal that is unclear or is given by anyone other than the appointed signal person (with the exception of a stop signal given by anyone).
- The operator shall have final responsibility and control over the crane operations. When there is any doubt as to safety, the operator shall have the authority to stop and refuse to handle the loads until safety has been assured. Any manager, supervisor or person attempting to bypass the crane operator's authority on this issue will be removed immediately from the site.
- The load shall be attached to the hook by means of slings or other approved devices, and no open hooks shall be used. Hooks shall have functional safety latches.

- A shackle shall be used to retain two or more choker eyes in the hook.
- Hooks shall not be changed, defaced or deformed in any manner. Hooks that have been exposed to excessive heat such as welding, burning, grinding, etc. will not be allowed on-site.
- The operator shall position the hook over the load in a manner to prevent load swing.
- The operator shall determine that the rope is properly seated in the drum and in the sheaves; the load line is not kinked; and multiple part lines are not twisted around each other.
- Shake out hooks will be used only for shaking out materials. During hoisting, the operator shall not suddenly accelerate/decelerate a moving load; allow the load to contact any obstructions; swing loads over personnel; or allow side loading or load dragging.
- All load rigging equipment shall be appropriately rated. Ratings shall be displayed on the device.

5.17.10.3 Rigging Requirements

- Rigging will only be completed by competent individuals who have received training on proper rigging techniques. Evidence of such training must remain with riggers during working hours.
- All rigging equipment shall be inspected prior to each use. Damaged or defective slings shall be immediately removed from service and destroyed.
- "Shop-made" grabs, hooks, clamps or other lifting devices are prohibited.
- All rigging equipment shall have a safety factor of five.

5.17.10.4 Safe Operating Practices

- Slings shall not be shortened by knots, bolts or other makeshift devices.
- Wire rope slings shall be padded or softeners used to protect against damage due to sharp corners.
- Slings used in a basket hitch shall have the loads balanced to prevent slippage.
- Loads handled by slings shall be landed on cribbing or dunnage so that slings will not be pulled from under or be crushed by the load.
- Slings subjected to shock loading shall be immediately removed from use and destroyed.
- Tag lines will be used with all lifting operations.

- Repair to rigging equipment is prohibited. It shall be removed from service and destroyed or sent to the manufacturer for repair.

5.17.10.5 Inspections and Recordkeeping

- A thorough written inspection of slings, ropes and chains in use shall be made on a regular basis, but not less frequently than six months.
- A record of inspections shall be maintained.

5.17.10.6 Work Platforms Suspended from Cranes

- A permit is required prior to using a crane for lifting personnel in a suspended platform. The platform must be certified by a professional engineer. The permit will be issued by the contractor when it is determined that the use of the platform is the only feasible method of accomplishing the task. The safety checklist included with the permit will be utilized prior to hoisting personnel. A pre-lift meeting must take place prior to the lift and be documented. Fall protection must be in place according to regulatory and FCX Fall Protection standards. Personnel and materials cannot be lifted together.

5.18 Sanitation

5.18.1 Potable Water

- An adequate supply of potable water shall be provided by each contractor. Consideration must be given to factors such as temperature, altitude, physical exertion of the workers, and the number of workers consuming water.
- Portable containers shall be tightly closed and equipped with a tap. Water shall not be dipped from containers, and use of a common, shared drinking cup is prohibited.
- Any container used to distribute drinking water shall be clearly marked as to its contents and not used for other purposes.
- Single serving cups shall be supplied, along with a sanitary container for the unused cups and a receptacle with lid for disposing of the used cups.
- Water containers will be sanitized and inspected weekly.
- Toilet facilities shall be provided for employees according to the following criteria:
  - At minimum, meet regulatory requirements.
  - Adequate washing facilities shall be provided by the contractor when employees are engaged in the application of paints,

coatings, herbicides, insecticides, or any other operations where contamination may be harmful to the employees.

5.18.2 Environmental

- Must comply with all relevant and applicable federal, state and local laws and permits, Corporate Environmental Policy, and applicable site Environmental Policies.
- Will properly label, accumulate and dispose of all waste materials generated from activities in accordance with site procedures or guidance. In no case may a contractor transport or dispose of a waste off-site. The contractor must coordinate all disposal activities with the Environmental Department.
- No waste transporters, disposers, recyclers or scavengers will be allowed on site without prior approval from the Environmental Department.
- No material is to be abandoned at the site. If material is found at the site, the contractors will be responsible for all expenses involved in collecting, managing, and disposing of the materials abandoned.
- In no case shall a new chemical product or material be used on site until a *Material Safety Data Sheet* (MSDS) and *Product Approval Form* have been submitted and approved by the Environmental and Health/Safety Departments. When approved, it must be properly labeled and have the appropriate MSDS. Un-used material must be removed by the contractor from the site when the job is complete.
- The Contractor shall not allow discharges to drains and/or sewers without prior written approval from the Environmental Department.
- Shall take reasonable steps to prevent any release or spills of hazardous materials.
- Shall immediately notify the Environmental Department, project engineer and/or area supervisor of any spills, releases or other environmental incidents.
- All employees must be properly trained and competent to perform the assigned work and tasks, including the proper handling of materials and equipment, proper response to incidents involving its material and general information relating to the site's Environmental Policies. Training documentation must be provided to the Environmental Department prior to commencing work.
- Must obtain, prior to commencing work, all necessary environmental approvals or permits and provide copies of such permits/approvals to the Environmental Department.
- Must obtain approval from the Environmental Department prior to initiating any of the following:
    - Installing a new tank
    - Moving an existing tank
    - Altering a tank
    - Reusing an out-of-service tank
    - Emptying a tank for temporary or permanent status

- Trash, rubbish and non-hazardous waste receptacles with lids (dumpsters) shall be placed around the site for collection of waste materials. Good housekeeping shall be maintained in an ongoing manner by the contractor. Accumulation of trash, debris, construction materials, waste, etc. is strictly prohibited.
- No persons shall be allowed to eat, drink or smoke where chemicals, hazardous material or waste material is present.

5.19 Motor Vehicles and Heavy Equipment

- Vehicles and equipment brought on-site shall be inspected, tested and certified to be in safe operating condition. The inspection, test, or certifying document must be available for review.
- All motor vehicles shall be equipped with the following equipment in good operable condition, including:
  - Adequate brake system, emergency brake system and brake lights
  - Two headlights and two tail lights
  - Horn
  - Seat belts (use is mandatory)
  - Good tires (more than 20/32“)
  - Windshields, powered wipers and defrosters
  - Rearview mirror when applicable
  - Fuel caps
  - Fire Extinguisher (minimum 5 pound)
  - First-Aid Kit
  - A buggy whip and flag that meets site requirements for visibility for vehicles operating in the mine or any other areas as defined by site procedures
- Only authorized, trained, certified (per site requirements) drivers shall be allowed to operate heavy equipment.
- All cab glass shall be safety glass or equivalent that introduces no visible distortion.
- No employee shall use a motor vehicle or equipment having an obstructed view to the rear unless:
  - The vehicle has a functioning backup alarm audible above the surrounding noise level
  - The vehicle is backed up only when an observer signals that it is safe to do so
- No personnel shall be allowed to get on or off moving vehicles or equipment.
- Heavy machinery, equipment, or parts thereof which are suspended or held aloft by use of slings, hoists, or jacks, shall be substantially blocked or

cribbed to prevent falling or shifting before employees are allowed to work under or between them. Bulldozer and scraper blades, end loader buckets, dump bodies, and similar equipment shall be either fully lowered or blocked when being repaired or when not in use. All controls shall be in neutral position, with motors stopped, key removed and unit tagged: "Do Not Operate", brakes set, and wheels chocked, unless work being performed requires otherwise.

- Engines shall be shut off during fueling or maintenance operations and when left unattended.
- Trip handles for tailgates of dump trucks and heavy equipment shall be arranged so that, in dumping, the operator will be clear.
- All vehicles shall be checked at the beginning of each shift to ensure that equipment and accessories are in safe operating condition and free of apparent damage that could cause failure while in use. The results of this inspection and corrective action will be documented and kept for duration of project or one year.
- No persons shall be allowed to ride in the bed of a truck unless seats, seatbelts, and roll-over protection are provided.
- No vehicle shall be driven at a speed greater than the posted speed limit for the property. Regard for weather, traffic, width of intersections, character of the roadway, type of motor vehicle, and other existing conditions may reduce this maximum speed limit.
- An accessible fire extinguisher of 5 BC rating or higher shall be available to the operator of equipment and vehicles.
- Rollover protection (ROPS) as specified by federal, regional, local is required for all applicable equipment operated on the project. Grandfather clauses will not be accepted.
- Contractors are to use supplier or service roads whenever possible. Haul roads will be used only when no other means of access is available. Drivers/operators within the active mine area shall have current, site-specific driver training. When they must be used, haul trucks and all heavy equipment shall have the right-of-way at all times.
- No vehicle or equipment shall cross over the top of power cables or pipes except at designated crossings where it has been protected from damage.
- When operating a vehicle in the vicinity of mine or heavy highway equipment, maintain a minimum safe following distance in accordance with site requirements.
- Anyone that must drive in the mine or hauling areas must have an "In Pit Driver's License" which can be obtained at the site.

5.20 Protection of Employees and the Public

All necessary precautions shall be taken to prevent injury to the public or damage to property of others. Precautions to be taken shall include, but are not limited to, the following:

- Work shall not be performed in any area occupied by the Freeport-McMoRan or the public unless specifically allowed by the Freeport-McMoRan.
- When it is necessary to maintain public use of work areas involving pedestrian ways and vehicular roadways, contractors shall protect the public with appropriate shields, signage, barricades, guardrails, adequate visibility and entrance/exit.
- Appropriate warnings and instructional safety signs shall be conspicuously posted. In addition, a signalman shall control the movement of motorized equipment in areas where the public might be endangered.
- A temporary fence shall be provided around the perimeter of aboveground operations and excavations adjacent to public areas. Perimeter fences shall be at least 6-feet high.
- Barricades shall be provided, where required, between work areas and walkways unless fences or guardrails, or sidewalk sheds, have been used. Barricades shall be secured to prevent accidental displacement and shall be maintained except where temporary removal is necessary to perform the work. During the period when a barricade is temporarily removed for the purpose of work, a watchman shall be positioned at each opening in the barricade.
- Temporary sidewalks shall be provided when a permanent sidewalk is obstructed by a contractor's operation.
- Warning lights shall be maintained from dusk to sunrise around excavations, barricades or obstructions in designated areas. Illumination shall be provided from dusk to sunrise for all temporary walkways in both owner-controlled and project areas.

5.21 Highway Work

All work on, or adjacent to, existing public and jobsite roadways shall be performed in conformance to site requirements and applicable jurisdiction requirements. Refer to Australian Standard (AS) 1742.3-2009 Manual of Uniform Traffic Control or the current U.S. Federal Highway Administration Manual on Uniform Traffic Control Devices for guidelines.

5.22 Demolition

Prior to commencing any demolition activities, an engineering survey shall be conducted by a competent person.

5.22.1 Utilities

All utilities and process product lines shall be identified and located, as appropriate, disconnected and locked out so that workers will not be injured by electrical energy, natural gas or other energy sources.

5.22.2 Processes

All processes normally operating within the structure to be demolished shall be shut down, bled or evacuated, all process chemicals properly disposed of, and lines thoroughly purged. Lines, vessels, tanks, etc. shall be tested to verify that emptying and purging have effectively removed materials of concern.

5.22.3 Environmental Exposures

- Asbestos and other hazardous materials shall be identified and removed by certified contractors in accordance with state, federal or local regulations. Employees shall be properly protected from the exposure during and subsequent to abatement work. Such materials will be contained so that environmental contamination does not occur.
- Past operations may have used materials that contain, or are contaminated with, arsenic, lead or other toxic materials. These materials must be identified and removed in the proper manner by certified contractors.

5.22.4 Dust Control

Whenever demolition operations are expected to produce dust, water or other environmentally acceptable dust suppressant materials will be used to control that dust.

5.23 Plant Interface

In areas where contractor's work must interface with current operations, the owner's operations supervisor will be contacted prior to commencing work and daily thereafter. All work will be planned and coordinated with the operational supervision at every step of the interface activity. Contractor personnel shall abide by all health and safety procedures while within the area. Activities on the part of either the owner or contractor which may result

in hazardous or harmful conditions or activities shall be communicated daily when they occur.

5.24 Blasting

It is expected that all federal, regional, local requirements shall be met whenever blasting is required. All contractors who will be blasting during the course of the contract must review and adhere to the Blasting guidelines and controls located in the Appendix section of this manual in addition to those required by regulatory agencies. The contractor will provide Freeport-McMoRan with a copy of the blasting permit for the operations.
In the absence of mandated requirements, refer to 1) manufacturer's recommendation; 2) U.S. Department of Alcohol, Tobacco, and Firearms (ATF); or 3) the local blasting expert.
The contractor must submit a security plan for the control of explosives and blasting for review and approval of the Project Manager.

5.25 Mobile Crushers

If a mobile crusher is used on the project, the contract company must obtain a permit from the appropriate regulatory agency prior to assembling the unit. Where applicable, any other registrations or certifications (such as a Mine Identification Number) shall be provided to the Project Manager. Copies of the permit, registry, certifications, etc must be provided to Freeport-McMoRan prior to commencement of work.

6.0
Hazard Communication

6.1 Hazard Substances Inventory

- All hazardous substances, including chemicals require prior approval from the Health and Safety and Environmental Department before being brought on site.
- The contractor shall provide a list of all hazardous substances proposed for use for the contract along with the corresponding SDS for each; the anticipated site quantity; and the location. This shall be made available to Freeport-McMoRan for approval purposes.
- The list and SDSs shall be updated on all ongoing basis -- substances previously not included in the initial submittal are subject to site approval and must undergo review before being brought onto the property.
- Care shall be taken to select and use materials which can successfully accomplish the required work with minimal health or environmental impact--for example, using non-silica containing blast grit for paint removal
- Unless specifically directed otherwise in writing, the contractor shall remove all hazardous substances from the site within 3 days of completion of the work involving the substances or within 3 days of completion of the contract, which-ever occurs first.

6.2 Safety Data Sheets (SDS)

In addition to maintaining the hazardous material list, contractors must maintain the most current material safety data sheets provided by manufacturers and distributors. Should the contractor not receive an SDS from the manufacturer or distributor, one must be requested and obtained. Copies are to be available at the work site for review by any employee, regulator or Freeport-McMoRan representative. Copy of SDS shall be provided to Freeport-McMoRan Health and Safety Department upon request.

6.3 Container Labels

Contractors must ensure that existing labels on incoming containers are not removed or defaced and that such containers are clearly marked as hazardous.

Each container shall be labeled with the identity of the chemical, the hazard warnings appropriate for employee protection and the name and address of

the manufacturer. Labels shall be legible, in English (plus any other language required), and prominently displayed.

6.4 Written Hazard Communication Program

Each contractor shall establish a written, comprehensive hazard communication program that includes guidelines for obtaining and maintaining SDS, the hazardous materials inventory and proper container labeling. It shall include a description of the employee training to be given during orientation training and meet all regulatory requirements.

6.5 Employee Training

Contractors shall establish a training and information program for personnel exposed to hazardous chemicals in their work area at the time of initial assignment, whenever a new hazard is introduced into their work area and on an annual basis thereafter. The training shall include discussion on the use and application of the specific product which may affect the hazards of exposure to the worker. The discussion topic shall include, at least:

- The existence of this hazard communication standard and the requirements of the standard
- The components of the hazard communication program in the workplace
- Operations in the work area where hazardous chemicals are present
- Location and use of the written hazard evaluation procedures, communications program, list of hazardous chemicals and the required material safety data sheets
- Health effects and symptoms of over-exposure associated with the chemicals used
- Safe operating procedures to prevent over-exposure
- Explanation of labeling system
- Access to SDSs
- Discussion of relevant or important sections of the SDS

7.0
Confined Space Entry

7.1 Responsibilities

7.1.1 Contractor's Site Safety Officer and Competent Person

The Contractor must have a written confined space entry program available on-site which meets all applicable regulatory and site-specific requirements. The contractor's site safety professional is responsible for overseeing the technical aspects of this procedure. The safety professional or Competent Person:

- Classifies each confined space relative to the need for an entry permit
- Trains supervisors in their responsibilities and duties in connection with the confined space entry program
- Reviews and approves the selection of all personal protective equipment and instrumentation
- Audits confined space entry program execution
- Prior to entry, evaluates each confined space for existing or potential hazards
- Monitors the atmosphere of the confined space with an acceptable analyzer, and ensures that instruments are properly maintained and calibrated
- Identifies any tasks to be performed within a confined space that could create a hazardous atmosphere
- Provides an entry permit
- Reviews provisions of the entry permit with employees entering the confined space prior to entry
- Instructs employees and directs the execution of the confined space entry according to established procedures
- Assures that proper personal protection equipment is provided and used as required
- Designates a trained attendant for each confined space
- Trains all personnel involved in confined space entry and emergency rescue procedures, ensuring that the training is specific to the configuration, hazards, attributes, and controls of each type or class of confined space (by type or class, it is meant to differentiate between dissimilar spaces such as pits, vaults, vessels, chambers, tanks, etc.)
- When the entry has been completed, verifies that all personnel and equipment have been removed from the confined space and signifies that the space may be prepared for return to service
- Has available rescue equipment in the event of an emergency
- Stops work at any time he or she suspects the permit is being violated, or conditions have changed inside the confined space

- Ensure that the Contactor's Confined Space Entry Program complies with applicable federal, regional, or local regulations and the provisions of the Freeport-McMoRan Copper and Gold Confined Space Guidelines.

Refer to Appendix: Freeport-McMoRan Copper and Gold Confined Space Guidelines.

8.0
Hazardous Energy Control

8.1 Purpose

These key elements are required for hazardous energy control where the unexpected energizing and unrestricted release of hazardous energy could cause an incident. These elements shall be used by employees to take personal responsibility for consequence thinking, isolating, locking out and trying out / testing out equipment (LOTOTO). The intent is **NOT TO PROCEED** with work until action has been taken to eliminate or control all hazard / energy exposures to the extent that an incident **WILL NOT** occur. A written Hazardous Energy Control Procedure encompassing the following elements is required of contractors and shall remain on site for access and review by employees and Freeport-McMoRan personnel.

8.2 Scope

These key elements apply to all forms of energy, including, but not limited to: electrical, pneumatic, hydraulic, mechanical, chemical, potential energy and human behaviors. These key elements apply to all contract employees of Freeport-McMoRan.

8.3 Definitions

Actual site definitions may be expanded to fit site-specific requirements, but must comply with MSHA, OSHA, NFPA 70E, NEC, Sernageomin and other International Standards that may apply.

Affected Employee – An employee whose job requires him or her to operate or use a piece of equipment on which service or maintenance is to be performed under lockout/tagout/tryout, or whose job requires them to work in an area in which such servicing or maintenance is being performed.

Authorized Employee – An employee who places a personal lock on equipment isolation devices in order to perform servicing or maintenance on the equipment. An Affected Employee becomes an Authorized Employee when that employee's duties include performing maintenance or service.

Qualified Employee – An employee trained in and familiar with the operation and safety hazards of the equipment being worked on. By extension, a Qualified Employee also:

- Is capable of recognizing hazards associated with the work
- Is capable of avoiding hazards associated with the work

- Is capable of and approved to perform energy isolation and dissipation
- Is capable of and approved to perform energy measurement/testing and/or tryout

Energy Control Coordinator (ECC) – An Authorized Employee in charge of a lockout/tagout/tryout when multiple energy sources and/or multiple employees utilize a lock-box. This person must have a working knowledge of the equipment being isolated and will be assigned by supervision for each specific job. The ECC will request the assistance of a Qualified Employee to isolate the energy source(s). An ECC may be a Qualified Employee.

ECC Lock – Lock that is applied (by Qualified Employee) to isolated energy sources by the ECC to prevent energization. Each ECC Lock will have a single key and the ECC Lock never will be used to protect a person.

ECC Lock Identification Tag – Identification tag will be secured to the ECC lock and withstand a 50-pound pulling force. The identification tag will contain a suitable warning notice and a statement prohibiting unauthorized operation of the disconnecting means and removal of the tag. The tag will be identified as an ECC tag and the identity of the ECC applying the tag.

Energy Source – Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, human behavior or other energy.

Energized – Connected to an energy source (electric, hydraulic, pneumatic, chemical, mechanical, potential) or containing residual or stored energy.

Energy Isolating Device – A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: a manually operated circuit breaker, a disconnect switch, a manually operated switch by which conductors of a circuit can be disconnected from all ungrounded supply conductors, a line valve, a block, or any similar device used to isolate or block energy. Push buttons, selector switches, and other control type circuitry devices are not energy isolating devices.

Hazardous Energy Inventory Analysis (HEIA) – An analysis identifying all hazardous energy sources.

Job Safety Analysis (JSA) – A written document analyzing the work flow, safety requirements and hazards associated with a specific job.

Lockout – The placement of a lockout/tagout device on an energy isolating device ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout Device - A device that uses a positive means such as a lock, lock box, chain, cable, multi-lock hasp, etc. to hold an energy isolating device in the safe position and prevent the release of an energy source.

Lockout Identification Tags – Identification tags that will be secure to the lockout device and withstand a 50-pound pulling force. They also must withstand the environmental conditions in the workplace. The identification tags or information on the lock will contain a suitable warning notice and a statement prohibiting unauthorized operation of the disconnecting means and removal of the tag. The tag will have the identity of the employee applying the lock.

Normal Operations – The utilization of a piece of equipment to perform its intended function.

Personal Lock – An individually keyed lock or set of locks used for personal protection, for which there is only one key. When these locks are placed, the key must be under the exclusive control of the authorized employee performing the service or maintenance. These locks will be standardized by color, shape or size at each site and not used for any other purpose.

Pre Job Safety Discussion – A safety communications process between Authorized and Affected Employees prior to beginning work.

Tryout/Test out – Verification that all energy sources have been properly isolated, dissipated or controlled.

9.0
Emergency Evacuation

9.1 Purpose

All contractors have responsibility of developing and maintaining a current Emergency Response/Evacuation Plan for their employees on site. An emergency or disaster is defined for the purpose of this plan as an event or condition, which has the potential of causing bodily injury or harm to employees and/or significant damage to the plant and/or infrastructure.

9.2 Responsibilities

Contractors will develop a site-specific emergency response plan in coordination with the site-specific plans and procedures to include evacuation routes, rally point locations, emergency responders, communication plans, emergency alarms/signals and employee training.

9.3 Procedure

Upon declaration of a project emergency, the alarm and assembly procedures will be implemented immediately. It shall be understood and expected that the response shall include actions to properly stop or shut down work in a manner that does not result in injury to workers or create the potential to worsen or escalate the emergency.

9.3.1 Alarm

In the event of an emergency, the plant alarm will sound or May Day sounded over the radio. All Project personnel shall proceed to pre-designated assembly areas.

- Following the announcement of an alarm or May Day, radio traffic will be confined to emergency communications only.
- Telephone lines will be used only by those authorized for the purpose of dealing with the emergency.

9.3.2 Assembly

Upon receiving instructions to assemble, all craft employees will secure their work areas and walk in a calm, orderly manner to the assembly area. Securing a work area includes, but is not limited to, the following:

- All motorized equipment, welding equipment and burning equipment will be shut down.

- All gas, diesel, propane, electrical, open flame and other powered equipment will be shut down immediately. All work permits will become void.
- All electrically powered tools will be disconnected from their power source.
- Employees assigned to motorized equipment/vehicles will park off the site roads clear of fire-protection devices, i.e., hose houses, hydrants, and PI valves.
- Use or dispensing of flammable or combustible liquids and gases shall cease and containers of same shall be closed.
- Use or dispensing of corrosive liquids or solids shall cease and containers of same shall be closed.

NOTE: No vehicles other than emergency vehicles will be driven on the site in an emergency condition without the permission of the Site Security.

- Contractor supervision will ensure all employees working in remote areas and in confined spaces have been alerted and have proceeded to the assembly area.
- No attempt will be made to search the emergency for missing employees until:
    - A search is authorized by the Site Incident Commander or Security Personnel at the scene
    - It is determined that a search and rescue party can be reasonably protected and equipped during such a search
- Project emergency medical personnel will assemble in the First Aid Room, ready for any duties that might be assigned.

9.4 Emergency Evacuation Procedures

9.4.1 Common Types of Emergency

- Fire
- Chemical or Vapor Release
- Weather

9.4.2 Emergency System Testing/Mock Drills

- Emergency evacuation plans must be posted in all contractor controlled/inhabited buildings.
- Emergency evacuation procedures must be tested at least every 6 months.

- If the plant emergency alarm is sounded, all work must cease immediately. Employees are to proceed in an orderly fashion to the designated assembly area. Once clear of the area, employees will not be allowed to return to the area for any reason until the emergency situation is controlled.
- Employees should stay in the group they were working with so an accurate head count can be obtained.
- Supervision will immediately report head count to the site leadership team. Any missing individuals will be identified immediately to Freeport-McMoRan.
- Supervisors will remain with their crews and do the following:
- Monitor for signs of symptoms or exposure
- Provide or request assistance where needed
- Be prepared to direct employees with instructions given by senior management.
- Do not return to the area until the all-clear signal is sounded

10.0
Drug and Alcohol Testing/Programs

10.1 Policy

The safety of all personnel and quality of work is of paramount concern. The following activities will not be tolerated and will serve as grounds for removal from Freeport-McMoRan property and placement on the No Trespass List for all Freeport-McMoRan operations:

- Being under the influence of drugs or alcohol while on the jobsite
- Use of illegal drugs or alcohol while on the jobsite
- Possession of illegal drugs or alcohol on the jobsite
- Distribution of drugs or alcohol on the jobsite
- Presence of illegal drugs or alcohol in vehicles, offices or other work locations

10.2 Substance Abuse Prevention Program

Contractors with drug and alcohol programs shall have a written drug and alcohol program consistent with federal, state/regional, and local regulations. It shall be made available upon request. Contractors without drug and alcohol programs shall notify Freeport-McMoRan Project Manager, in writing of their absence of a Drug and Alcohol Program. It is the position and intent of Freeport-McMoRan to maintain a workplace free from the use and influence of drugs and alcohol—this includes all stakeholders in a safe workplace, including contractors. Contractor personnel shall be subject to "for cause" testing and shall be periodically included in site random testing. The probability of being selected for testing shall target 20% (or one chance in five.)

10.2.1 Program Application

This program shall apply to contractors (including subcontractors), all regular full-time, part-time, casual and contract employees, and suppliers and vendors.

10.3 General Conditions

10.3.1 Definitions

Drugs – Non-prescribed narcotics and illegal drugs, marijuana, related drug paraphernalia, and look-alike (simulated) drugs.

Company Premises – For the purpose of this policy, the term company's premises includes property, offices, facilities, land, buildings, structures, parking lots, access roads, fixtures, installations, automobiles, vessels, trucks and all other vehicles and equipment.

10.3.2 Prescription Drugs

The contractor shall acknowledge and address the likelihood that employees may report to work while taking medications prescribed by a physician. Employees should discuss the potential side effects of medications with the physician. Employees using prescribed medication that could produce side effects that affect the performance of their job-related duties shall notify their supervisor and/or designated site safety personnel.

Employees shall not report to work while under the influence of any drug, intoxicant, or other substance that will in any way adversely affect their working ability, including their alertness, coordination or safety.

The contractor shall provide training to their supervisors to educate them regarding signs and symptoms of substance abuse; the actions to take where there is reasonable suspicion that the worker may be affected by drug and/or alcohol use; and have the resources available to conduct drug and/or alcohol testing for cause or reasonable suspicion.

10.3.3 Drug Screening Test

In US operations where allowed by local, state and/or country laws, all employees or agents of contractors working at a site will be required to participate in the site drug and alcohol surveillance program, a NIDA-certified laboratory must be used. For any other operations, a certified lab shall be used where they are required by local regulators. Drug and alcohol testing shall occur at the time of employment under the provisions of the contractor drug and alcohol program. In those instances where the worker leaves the employ of the contractor, then subsequently returns, they shall be re-tested as a part of the recall/rehire process. The contractor must maintain an ongoing drug and alcohol program which includes random testing, for cause testing, post-accident testing, etc. A lapse or deactivation of the program will require that all employees assigned to work at a Freeport-McMoRan site or project be tested prior to being on site. The drug screening test shall require each employee to produce his or her sample (biological sample being one or more of the following: urine, blood, hair, breath as applicable and relevant). Freeport-McMoRan will not bear the cost and expenses associated with drug screening.

In accordance with the Freeport-McMoRan Substance Abuse Prevention Program, the urine sample will be tested, at a minimum, for the following substances and any other drugs deemed appropriate for the period of testing:

Cocaine Metabolite	Amphetamines
Opiates	Alcohol
Phencyclidine	Cannabinoids

Employees producing positive test results will NOT be allowed to work on a Freeport-McMoRan property for a period of 3 years from the date of the positive test result. Contractors who have programs for rehabilitation or "multiple strikes" must notify Freeport-McMoRan immediately upon learning of the positive results and remove that employee from the property and ensure they are not assigned to another Freeport-McMoRan location during the three year suspense period.

All test results will be handled with the utmost confidentiality. Access will be provided only on a need-to-know basis. All samples will be conveyed maintaining a documented chain of custody at all times.

In addition to drug screening testing conducted prior to employee's commencement of work at the site, the contractor will maintain an ongoing D&A program designed to ensure a drug-free workplace. Such policies should include random drug tests and post-incident testing, as well as "for cause" testing.

10.4 Enforcement

Contractors will not tolerate the use, possession or distribution of alcoholic beverages or drugs on the property, nor the presence of any person under the influence of drugs or alcohol. Individuals found in violation of this policy will immediately be escorted off the property. Accordingly, persons who exhibit behaviors which cause there to be reasonable suspicion that they may be under the influence of drugs and/or alcohol will be directed to leave the owner's property and not return until the person's employer can certify to the owner that the employee has passed a timely drug test and/or non-invasive test for alcohol and, in fact, was not under the influence of drugs or alcohol. Individuals testing positive or who tamper with or alter a drug and/or alcohol sample or who refuse to submit to testing in a timely period will forfeit their right to work at a Freeport-McMoRan site.

On a quarterly basis, the Contractor shall provide information on their Drug and Alcohol testing processes and program which details:

- The number of persons tested each year
- The number of positive results determined each year
- The percentage of persons selected to be randomly tested along with the frequency of random testing
- The name of the consortium they participate in (if applicable)
- The name of the MRO

- A basic program description which describes the processes in place and who manages the program

NOTE: the Contractor shall not submit any information which contains names of individuals who have been or are subject to testing, nor any personal information such as social security numbers.

11.0
Appendix

11.1 OSHA-Regulated Sites

Most construction safety standards will be under CFR 29, part 1926. Additional safety standards may be covered under CFR 29, Part 1910 - General Industry Safety Standards. All contractors are required to comply with all applicable Health and Safety Standards under both 1910 & 1926.

- OSHA requires that all employers initiate and maintain effective safety programs. 1926 (6) (1) See following example.
- Safety programs are to provide for frequent and regular inspections of Work Areas, materials, and equipment. Deficiencies or problems will be noted and corrected prior to operation. Documentation of inspections will be kept for the duration of the project.
- Each employer must post an OSHA Job Safety and Health Protection poster in a prominent location at the project site.
    - An OSHA-prescribed Log and Summary of Occupational Injuries and Illnesses must be maintained by each employer.
    - All fatality cases and incidents in which three or more employees are hospitalized must be reported to OSHA area office within eight hours either orally or in person and the following information must be reported:
        - Establishment name
        - Location of incident
        - Time of incident
        - Number of fatalities or hospitalized employees
        - Contact person
        - Contact phone number
        - Brief description of incident

Training

The employer shall instruct each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to his work environment to control or eliminate any hazardous or other exposure to illness or injury.

Records of training, permits, safety meetings, etc. shall be maintained for a minimum of one year, unless there is a regulatory requirement for them to be retained for a longer period of time.

Record-Keeping, Permits and Documentation Requirements for Construction

- OSHA 300 Logs – 5 years plus current

- OSHA 301 or equivalent
- Annual crane inspection records
- Crane load chart
- Personnel platform – engineering drawings and proof test record
- Custom made rigging devices – engineering drawings and proof test record
- Concrete test records
- Concrete form diagrams
- Insurance company audit reports
- Minutes of safety meetings
- Written safety program
- Incident investigation records
- List of chemicals on site
- Written hazard communication program
- Written respirator program, and respirator fit-test records
- Records of sampling for asbestos, silica or other contaminants
- OSHA poster
- Posted statement on access to medical records
- Material Safety Data Sheets
- Confined space entry program
- Lockout – Tagout program
- Record of hydrostatic testing of fire extinguishers
- Explosive inventory
- Assured equipment grounding program
- Record of air quality testing performed in tunnels\confined spaces
- Hot work permit program
- Emergency action plan
- First aid kit inspection records
- Ladder inspection records
- Fall protection equipment inspection records
- Required training records
- Excavation Competent Person and Safe Excavation processes and procedures per 29 CFR 1926.651
- Plans for excavations reaching or exceeding 20 feet or more in depth

Employer's Safety and Health Program

Management's Commitment and Leadership

- Policy statement: Goals established, issued and communicated to employees
- Program revised annually
- Participation in safety meetings, inspections; agenda items in meetings.

- Adequate commitment of resources
- Safety rules and procedures incorporated into site operations
- Management observation of safety rules

Assignment of Responsibility

- Safety designee on site, knowledgeable and accountable
- Supervisors' safety and health responsibilities understood
- Employees adhere to safety rules

Identification and Control of Hazards

- Periodic site-safety inspection program involves supervisors
- Preventive controls in place (PPE, maintenance, engineering controls)
- Action taken to address hazards
- Safety committee established, where appropriate
- Technical references available
- Enforcement procedures by management

Training and Education

- Supervisors receive basic training
- Specialized training taken where needed
- Employee training program exists, is ongoing and is effective

Recordkeeping and Hazard Analysis

- Records of employees' illnesses/injuries maintained and posted
- Supervisors perform incident investigations, determine causes and propose corrective action
- Injuries, near misses and illnesses are evaluated for trends/ similar causes; corrective action initiated.

First Aid and Medical Assistance

- First-aid supplies and medical services available
- Employees informed of medical results

Reporting

All incidents (regardless of severity) shall be immediately reported to the Freeport-McMoRan site Safety Department

11.2 MSHA-Regulated Sites

Certain regulations are highlighted in this section. However, the contractor will be required to follow all the applicable regulations set forth in the Code of Federal Regulations (30 CFR).

30 CFR Part 41: Notification of Legal Identity

Contractors conducting mining, milling and/or crushing operations shall notify MSHA of the operation and be assigned a legal identity number. Correspondence shall include the site Mine ID number with the contractor ID

number as an added extension. Reporting and filing shall be kept separate for each site that the contractor works. The contract company shall also make notification to the State Mine Office where applicable to obtain a State Mine ID number.

30 CFR Part 43: Procedures for processing hazardous conditions complaints

30 CFR Part 45: Independent Contractors

General Enforcement policy for Independent Contractors

- Definition of Independent Contractor
- MSHA identification of independent contractors
- Independent contractor register

30 CFR Part 48: Training and Retraining of "Miners"

- All training is required to be completed prior to an employee commencing work activities
- Newly Employed Inexperienced Miner
- Newly Employed Experienced Miner
- Hazard Training
- Site-Specific Training
- Task Training
- Annual Refresher Training
- Supervisor and employee first-aid training
- All training shall be documented on a 5000-23 form
- All contractors should submit a training plan for approval by MSHA and have an approved instructor for on-site training. Cooperative training may be utilized for Surface Operations. This includes two days of classroom training. Companies should realize, however, that new miner training includes an additional day of training (24 hours). The third day of training must be completed on the mine site prior to work assignment and a 5000-23 must be signed by an MSHA-approved instructor.
- For underground operations, this includes 30 hours of classroom training and at least 8 hours on the mine site.

30 CFR Part 56 and 57: Metal/Non-Metal Safety and Health Regulations

- All contractors shall comply with all regulations mentioned above as well as any and all regulations set forth in the CFR 30. At any time, Freeport-McMoRan representatives may conduct health and safety audits to ensure compliance and or note improvements.

- Freeport-McMoRan site safety professionals may assist with questions concerning federal or state regulation compliance.
- Reporting
- All incidents (regardless of severity) shall be immediately reported to the Freeport-McMoRan Health & Safety Department.
-

30 CFR Part 50: Accident, Injuries, Illnesses, Employment, and Coal Production In Mines

The following sections of the Act should be reviewed and understood by contractors working on an MSHA regulated site.

- Citations for Failure to Report Under Part 50
- Part 50 Audit After a Fatal Accident
- Part 50 Notification, Investigation, Reporting and Recordkeeping Requirements
- Reporting and Investigating Blocked Passage through the Tailgate Side of Longwall
- Mining Operations in Coal Mines
- Criteria – Differences Between Medical Treatment and First Aid

30 CFR Part 50.10: Immediate Notification

If specific types of incidents occur, an operator shall immediately (within 15 minutes) contact the MSHA District or Sub-district Office having jurisdiction over its mine. Additionally, many states also require such notification. It is the responsibility of the contractor to identify and comply with both state and federal notification requirements. Immediate notifications must be made to Freeport-McMoRan personnel BEFORE notification to a government agency. If an operator cannot contact the appropriate MSHA District or Sub-district Office, it shall immediately contact MSHA Headquarters Office in Arlington, Va., by telephone at (800) 746-1553.

30 CFR Part 50.2(h): Accidents Requiring Immediate Notification

- A death of an individual at a mine
- An injury which has a reasonable potential to cause death
- An entrapment of an individual for more than 30 minutes
- An unplanned inundation of a mine by a liquid or gas
- An unplanned ignition or explosion of gas or dust
- An unplanned mine fire not extinguished within 30 minutes
- An unplanned ignition or explosion of a blasting agent or an explosive

- An unplanned roof fall at or above the anchorage zone in active workings where roof bolts are in use; or an unplanned roof or rib fall in active workings that impairs ventilation or impedes passage
- A coal or rock outburst that causes withdrawal of miners or which disrupts regular mining activity for more than an hour
- An unstable condition at an impoundment, refuse pile, or culm bank which requires emergency action in order to prevent failure, or which causes individuals to evacuate an area; or failure of an impoundment, refuse pile or culm bank
- Damage to hoisting equipment in a shaft or slope which endangers an individual or which interferes with use of the equipment for more than 30 minutes

An event at a mine which causes death or bodily injury to an individual not at the mine at the time the event occurs

30 CFR Part 50.20: Preparation and submission of MSHA Report form 7000-1 – Mine Accident, Injury, and Illness Report

All incidents meeting the reportable criteria shall be reported using the 7000-1 form. If the incident is reportable but does not meet the immediate notification criteria, the form shall be submitted within 10 days of notification of the injury. The incident reflected on the 7000-1 form must be summarized quarterly on the MSHA 7000-2 form.

Incident Investigation

- Any accident or incident resulting in a fatality, lost time injury, medical treatment injury, damage to property or equipment, or a serious near-miss is to be thoroughly investigated by the contractor as soon as the situation is under control.
- Results of the investigation, including signed witness statements, photographs, first report of injury forms, complete analysis, sketches, drawings (used to pinpoint distance and location, etc.) shall be documented and signed. A complete copy shall be available for review by Freeport-McMoRan, and where required by regulatory agencies.
- In addition, the employer must complete the Arizona State Mine Inspectors Accident Report (if operating in Arizona) for each lost-time incident.
- Any contractors with questions concerning training requirements should not hesitate to call the owner's site Safety Department.
- All courses and related training material must be adapted to the specific operation and practice where a contractor's employees work, and must

be conducted in the manner as described in the contractor's approved training plan in accordance with CFR 30 Part 48.

11.3 Blasting Safety

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Department of Health & Safety Guideline		GUIDELINE NO.	FCX - 15
		REVISION NO.	New
		SUPERSEDE	
Blasting Guideline		TASK CLASSIFICATION	Highly Critical / Critical / Non-Critical
APPROVAL DATE –	ORIGINAL DATE –	RELEVANT SOPS – SITE SPECIFIC	

I. Purpose and Scope

These guidelines apply to all Freeport-McMoRan employees and contractors involved in blasting activities and outlines Blasting SOP minimum requirements for all operations. This document provides a set of standards that site SOP's must address.

Sites have varying levels of interaction with Blasting Contractors; these guidelines apply regardless of the degree of contractor involvement. Ultimately, a Responsible FCX Employee will be accountable for all surface blasts on site including project work.

II. Definitions

- Responsible FCX Employee – Blasting Supervisor, Blasting Engineer, Lead Blaster or other qualified person who is a direct employee of FCX. This definition does not include contract blasting personnel.
- Direct Control – Having face-to-face contact to ensure clear and concise communication.
- Blast Site- Is the area where explosive materials is handled during loading including the perimeter formed by the loaded blast holes and 50 feet (15.3 meters) in all directions from loaded holes. A minimum distance of 30 feet (9.1 meters) may replace the 50 foot requirement if the perimeter of loaded holes is marked with a barrier.
- Blast Area- The area in which concussion, flying material or gases from an explosion may cause injury to persons.
- Stemming - refers to rock crushed to 80% 1 inch to 1 ¼ inch with a maximum size of 2 inch, there should be no fines.
- Explosives Transport Truck- The vehicle that carries blasting accessories (powder truck).
- Misfire- Complete or partial failure of explosive material to detonate.
- Sweeping/Clearing- The process of ensuring all personnel are removed from the blast area prior to detonation.
- Problem hole- Is a hole that:
  - ✓ has a "bridge over" condition;
  - ✓ takes too much or too little stemming
  - ✓ has lost, cut or damaged downlines
  - ✓ is too close to the crest
  - ✓ is too close to an adjacent hole
  - ✓ is not identified in the blast plan
  - ✓ is too short or too deep
  - ✓ has column subsidence
  - ✓ has other inconsistencies

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III. General Requirements

- Site specific SOP's will clearly designate a **Responsible FCX Employee**.
- SOP's will insure that blast locations and expected time is communicated to affected work groups daily.
- Blast initiation devices will be serviced annually or more frequently if specified by the manufacturer.
- **Each site will have a lightning detection system and safety procedures in the event of an approaching electrical storm.**
- Personnel will be trained and demonstrate competency to recognize and manage distractions and process interruptions. All training shall be documented.
- All blasting processes will be carried out in a safe and efficient manner.

IV. Responsibilities

- Responsible FCX Employee will:
  - ✓ Provide **field oversight** of the entire blasting process. (Ensure delivery of the blasting plan to the crew and monitors work to ensure SOPs are followed)
  - ✓ Ensure the blast design has been reviewed by a qualified person to verify that the initiation plan and hole timing are reasonable. If more than one shot is planned, the initiation plan and delay between shots will be evaluated to make sure that the shots do not interfere with each other.
- FCX and Contractor Supervisors will assess the work load for crew members and allocate resources as appropriate to minimize distractions and decision making errors.
- Mine Managers will:
  - ✓ champion safe blasting processes,
  - ✓ provide leadership that minimizes perceived haste
  - ✓ ensure that blasting processes and geotechnical activities are coordinated
  - ✓ ensure audits are performed and action items are addressed
  - ✓ ensure that sufficient and capable staff are available to oversee blasting processes
- Blockers- An FCX employee (for production blasts and secondary blasts) whose assignment begins at the pre-initiation meeting is responsible for blocking traffic at the assigned area, understands the assignment, follows instructions without deviation, stops the initiation process if a deviation to the blocking plan is detected. For project blasts using contractors site will follow the D & B Contractor Guidelines
- Blasting Engineers or other qualified persons will oversee the drill pattern design, determination of loads and timing, taking into consideration the type of material, fragmentation and geotechnical requirements.

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V. Identification of Blast Holes – Drilling and Sampling

The purpose of this section is to insure that holes are properly identified.

- Drillers will place a numbered stake at each cuttings pile and verify that the stakes are numbered correctly.
- Extra holes that are drilled for maintenance or any other reason will be properly identified with a stake that reads "Do Not Load". These holes will be filled prior to Priming whenever possible.
- Each site will develop SOPs to inspect the pattern for unlabeled holes and will include steps to properly notify the Responsible FCX Employee.

VI. Pre-shift Team Meeting

A pre-shift meeting will be held by blasting crews each shift. The pre-shift meeting shall include the following:

- ✓ Work locations
- ✓ Unique or continuing hazards
- ✓ Equipment needed for assigned work
- ✓ Hole specific loading instructions for a pattern (Water, hardness, product, etc)
- ✓ Identification of parties for communication and unique work being done in areas adjacent to the blast site
- ✓ Preliminary blocking locations
- ✓ The anticipated time of the blast
- ✓ Identification of the Responsible FCX Employee
- ✓ Other pertinent information

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VII. Pre-loading Area Inspection

The purpose of this section is to insure that the risks associated with the blast are identified and controlled.

- Blast area inspections shall be performed before loading starts.
- The Responsible FCX Employee will verify that the blast plan map accurately represent the blast pattern in the field (i.e. number of holes, hole locations, problem holes).
- Sites will verify that all potentially affected persons have been informed of blast.
- During the inspection blast site access and egress routes shall be evaluated and appropriate actions taken.
- The Responsible FCX Employee will determine the boundaries of the blast area. The following items shall be considered when determining the boundaries of the blast area:
  - ✓ Concussion
  - ✓ Fly rock
  - ✓ Fumes, ventilation and prevailing wind conditions
  - ✓ Air blast
  - ✓ Subsidence
  - ✓ Adjacent infrastructure
  - ✓ Equipment locations including maintenance activities
  - ✓ Noise and vibration
  - ✓ Geological features
  - ✓ Adjacent underground or surface workings
  - ✓ Hazards associated with the loading pattern
- Holes not intended to be loaded will be labeled with BO or do not load
- Any unlabeled holes that are discovered will be properly identified through consultation with the map and the Responsible FCX Employee.
- Questions or concerns that arise from the area inspection will be resolved through consultation with the Responsible FCX Employee before loading starts.

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VIII. Explosive Storage and Transportation

The purpose of this section is to insure that explosives are handled and transported safely and in accordance with regulations.

- A person or persons will be assigned responsibility for managing the magazines.
- All outdoor magazines will be built to the BATF standards and sited to the American table of Distances.
- All magazines will be:
  1. Fitted with a lightning protection system.
  2. Constructed outside the corridors of power transmission lines.
  3. Properly signed with; "No Smoking", "Explosives Stored Here" and "Authorized Personnel Only".
- The location of all fire extinguishers will be clearly marked.
- All magazines will contain a book or similar method for the recording of all explosives movements in and out of the magazine and current inventories. If the records are kept in a central office each magazine will have its own section to record movement of product from that magazine.
- If materials other than explosives are being stored within the magazines they will be segregated from the explosive materials.
- All magazines will contain an updated copy of authorization, permits or licenses.
- The locks on magazines will be rotated per regulatory standards.
- Bills of Lading (BOL's) and packing lists shall be kept in a secure location for the specified minimum period of 5 yrs.
- All explosives, detonators, and accessories will be transported in accordance with statutory regulations. (See Appendix A)

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IX. Priming

The purpose of this section is to insure that detonators and primers are handled safely and usage matches blast design. This will allow for proper accounting of detonators and primers prior to loading.

- All holes will be taped for depth and water level before priming. The Responsible FCX Employee will be notified of any significant variance from expected measurements before the hole is primed.
- The blast site will be secured with yellow cones and warning signs will be used to block all accesses to the blast pattern to be primed and loaded.
- Explosives products will be laid out in a careful, efficient and well coordinated manner (between holes, on the outside of the cuttings pile and out of the flow of traffic).
- Primers will be assembled only at the hole collar and will immediately be carefully lowered into the hole.
- All detonators will be fully enclosed within the booster according to the manufacturer's recommended procedures.
- When down hole detonators are used a redundant down line will be required, at least one of which will be an electronic system capable of being verified from the surface.
- A standard weight or anchor system will be used to secure down lines into position at the surface.
- An inventory of boosters and detonators will be done in the field, at each blast pattern and verified against the blast plan map. The Responsible FCX Employee will cross check the detonator inventory after the products are laid out to insure that the amount used matches the number of holes on the pattern.

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X. Loading

The purpose of this section is to insure that holes are loaded per the blast design and that problems that arise during loading are dealt with appropriately.

- All holes will be re-taped for depth and water level before loading.
- The loading trucks will wait to load holes until they have enough holes primed to empty a truck.
- The powder column rise of each hole will be continuously monitored until the stem height is reached or the appropriate weight of explosives is loaded. Any deviation from expected column rise over a set amount during loading will be immediately brought to the attention of the Responsible FCX Employee.
- Loading personnel will know the upper weight limit of product to be loaded and the planned stemming height of each hole.
- Interruptions in the loading process will be documented and communicated to the Responsible FCX Employee.
- All loading trucks will be parked off the pattern after loading is finished.
- Explosives transport trucks will not be left unlocked with explosives on board. They will be relocked immediately after unloading.

XI. Stemming

The purpose of this section is to insure that stemming activities are done in such a way to eliminate cut downlines, "bridge overs" and help identify problem holes.

- The recommended stemming material and equipment is:
  - ✓ Clean crushed gravel as specified in the definition of stemming
  - ✓ Side-dump articulating loader
- The stemming process will not begin until after all the holes are primed and the loading is far enough ahead so that stemming activities will not interfere with the loading process.
- Stemming material shall be strategically placed at the blast site using a spotter.
- Detonator downlines will be positioned to eliminate damage.
- Downlines will be secured prior to stemming.
- Stemming material shall be carefully poured down blast holes to eliminate downline damage and control dust.
- Stemming operators should safeguard against oversized material being accidentally introduced down blast holes.
- Stemming operators must be properly trained in procedures used in case of a lost, cut or damaged down line.
- Stemming operators shall inform the Responsible FCX Employee of any problem holes.
- The Responsible FCX Employee must address and ensure that any and all "problem holes" are reported on the Blast Summary paperwork. Unloaded or "bad" hole information should be included as well.

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XI. Stemming

The purpose of this section is to insure that stemming activities are done in such a way to eliminate cut downlines, "bridge overs" and help identify problem holes.

- The recommended stemming material and equipment is:
  - ✓ Clean crushed gravel
  - ✓ Auger stemming truck or side-dump articulating loader
- The stemming process will not begin until after all the holes are primed and the loading is far enough ahead so that stemming activities will not interfere with the loading process.
- Stemming material shall be strategically place at the blast site using a spotter (unless an auger stemming truck is used).
- Detonator downlines will be positioned to eliminate damage.
- Downlines will be secured prior to stemming.
- Stemming material shall be carefully poured down blast holes to eliminate downline damage and control dust.
- Stemming operators should safeguard against oversized material being accidentally introduced down blast holes.
- Stemming operators must be properly trained in procedures used in case of a lost, cut or damaged down line.
- Stemming operators shall inform the Responsible FCX Employee of any problem holes.
- The Responsible FCX Employee must address and ensure that any and all "problem holes" are reported on the Blast Summary paperwork. Unloaded or "bad" hole information should be included as well.

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XII. Tie-in

The purpose of this section is to ensure detonation of all holes in the blast pattern and proper timing of all holes.

- The Responsible FCX Employee shall generate a tie-in sequence diagram of every blast hole.
- This diagram will be included with the other blasting documentation required from the daily blasting activities.
- The Responsible FCX Employee shall review the sequence diagram with personnel doing the tie-in.
- Programmable electronic detonators with accompanying software and hardware are required. (Pre-split and secondary blasts are exempt).
- Tie-in of pattern shall begin only if it will not interfere with other blasting unit processes or cause distractions to those tying in.
- When using programmable delays, the blast crew will use the logger tests to verify hook up reliability. If a "bad" detonator is encountered the back-up system will be utilized. Documentation of the situation and extra product usage on the Blast Summary is required.
- For pre-splits or secondary blasting, after tie-in is complete, the pattern must be independently checked by two individuals, verifying completeness and matching to the blast map. Both should initial the check on the Blast Summary.
- Detonator count will be obtained from the data logger and a check made against the field inventory recorded on the Blast Summary (adjusted for "bad" or extra dets used if necessary). Any discrepancy must be reported to The Responsible FCX Employee and rectified before moving into the blast initiation stage.
- A shift supervisor and\or shot blockers should be notified at least 30 minutes prior to completing tie-in so that shot blockers can prepare for the pre-blast meeting.

XIII. Pre-blast Meeting

The purpose of this section is to insure that all personnel involved in the clearing and initiation of a blast are clear about their assignments, properly equipped and know their responsibilities.

- Prior to the pre-blast meeting numbered blue cones will be placed to MARK the blocking position.
- The pre-blast meeting will include all blockers and sweepers and will be face-to-face.
- The Responsible FCX Employee will conduct the meeting.
- Each blocker and sweeper will receive their assignment in the meeting and the Responsible FCX Employee will ask them to repeat back their assignment and their responsibilities.
- All blockers will remain at the meeting until the meeting is over.
- Yellow cones will be provided for each blocking position to block the road.
- All vehicles used for clearing and blocking will be equipped with a functional two way radio and functioning beacons and /or flashers.
- If vehicles are not used for blocking, a person with a flag, radio and yellow cones is acceptable.

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XIV. Securing and Holding Blocking Position

The purpose of this section is to insure that blocking positions are never compromised and clear, concise communication is maintained between the Responsible FCX Employee and each blocker.

- Securing and holding of blocking positions will be directed by the Responsible FCX Employee.
- Blockers will:
  - ✓ Will be trained and the trained to FCX standards and the training documented
  - ✓ Drive to assigned blocking location identified by the corresponding numbered blue cone.
  - ✓ Turn vehicles or equipment used for blocking perpendicular to the flow of traffic (if vehicles are used).
  - ✓ Use yellow blast cones to block the road.
  - ✓ Have contact with the Responsible FCX Employee via radio.
  - ✓ Communicate to the Responsible FCX Employee, in detail, actions taken to clear the area and the blocking position is secure.
  - ✓ Not permit entry to the secured area by anyone without permission of the Responsible FCX Employee.
- The Responsible FCX Employee will:
  - ✓ Prior to pre-blast meeting determine blocking locations and place a uniquely numbered blue cone at each location. This is to mark the blocking location NOT to block the road.
  - ✓ Maintain a blocker check list and use it to verify completion of assignments.
  - ✓ do a redundant check with each blocker prior to the last blast warning.
  - ✓ Instruct each blocker to hold their position if a delay occurs.
  - ✓ at the end of the delay, check with each blocker before continuing with the last blast warning.

XV. Clearing Blast Area

The purpose of this section is to insure that the blast is properly cleared and that all affected personnel are notified.

- Clearing for a shot will be directed / supervised by a Responsible FCX Employee.
- Clearing an area for a blast will begin at the blast site and proceed outward.
- All affected personnel will be notified prior to clearing to allow for orderly preparation and evacuation of the blast area.
- All affected equipment will be positioned or relocated to a safe position to minimize damage from fly rock or blast vibration.
- All equipment in the blast area will be physically cleared of personnel.
- During clearing, all entries previously cleared will be guarded to prevent re-entry into the cleared area ("back doors" will be held).
- Those clearing for a shot ("sweeper") must be FCX employees who have been trained and that training has been documented.

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XVI. Blast Initiation

The purpose of this section is to ensure all detonators are communicating, the blast area is clear and that all blocking positions are secure.

- Blast initiation will be directed / supervised by a Responsible FCX Employee
- Blast initiation will take place from a location safe from hazards resulting from blasting.
- The blast initiation location will be a safe distance from electrical interference (e.g. power lines, power cables, radios)
- The firing / initiation system will be enabled AFTER all clearing and blocking activities are finalized.
- The firing / initiation system will be in the possession of the blasters and under control of the Responsible FCX Employee at all times.
- The firing / initiation system will be connected by the Responsible FCX Employee or a person under his/her **direct control**.
- Two-way radio communication between the Responsible FCX Employee and all blockers will be maintained throughout the clearing, blocking and initiation processes.
- The Responsible FCX Employee will ensure that all electronic detonators used in a blast continue to "communicate" with the blast initiation device throughout the blast initiation process.
- The "communication" with electronic detonators will be checked against the detonator inventory taken during the priming and loading of each blast pattern and double checked against the final blast map.
- Blasting personnel will be competent in safe practices in the event that a blast fails to detonate.

XVII. Post Blast Inspection

The purpose of this section is to ensure that the blast holes have been detonated and the area is safe for reentry.

- A post-blast inspection will be performed under the supervision of a Responsible FCX Employee.
- All blockers will remain in place during the post-blast inspection.
- Yellow cones will demarcate the blast site until the post-blast inspection is complete and the Responsible FCX Employee gives the "all clear".

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XVIII. Blast Monitoring

The purpose of this section is to ensure that blast vibration data is recorded and utilized to manage slope stability.

- Blasts will be viewed from above if possible.
- A blast vibration monitoring system utilizing seismographs shall be instituted and actively managed, this means used by both Blasting and Slope Stability personnel.

XIX. Misfired Hole Procedure

The purpose of this section is to insure that personnel involved in the blasting process are trained to recognize a potential misfire and are familiar with the SOP's for dealing with a potential misfire.

- All blasting personnel will:
  - ✓ Know the definition of a misfire
  - ✓ Be familiar with the blasting products used
  - ✓ Be familiar with what a misfire looks like and how to determine if there is a misfire.
  - ✓ Be familiar with the waiting period for a suspected misfire.
- There will be systems in place to:
  - ✓ Document misfires and handle them properly
  - ✓ Mark misfires in the field in an easily recognized manner
  - ✓ Follow up on and investigate if there was a misfire and determine the cause
  - ✓ Develop action plans to deal with misfires including SOPs
  - ✓ Enter the misfire into shovel/loader computer GPS systems if used to alert shovel and loader operators of the location
  - ✓ Familiarize pit personnel with the SOPs for handling a misfire
- A safety session on unfired powder column and blasting component recognition will be part of shovel, loader and RTD training including annual refreshers.

XX. Sleeping / Guarding a Shot

The purpose of this section is to ensure shots slept overnight are safely managed.

- There will be an SOP for sleeping a shot.
- Shots will be slept overnight only in extraordinary circumstance.
- Shots slept overnight will be guarded or barricaded to prevent unauthorized access to the blast pattern.
- In the event of an approaching electrical storm, The Responsible FCX Employee or a designated shift supervisor will be responsible for clearing the blast area in the same manner as clearing for a shot.
- The Responsible FCX Employee or a designated shift supervisor will determine when activities may resume within the blast area.

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XXI. Record Keeping

The purpose of this section is to ensure accurate records are kept as required by regulation.

- Daily FCX Magazine inventories transactions shall be recorded for all blasting products checked out and unused product checked back in (FCX verification required).
- Magazine physical inventories shall be checked for accuracy at least once per month and verified by FCX supervision. Any discrepancy shall be immediately investigated.
- A yearly close out and starting inventory will be taken and maintained as part of the permanent records required by the regulatory agencies (FCX verification required).
- Each site shall maintain daily blasting documentation (Blast Summaries) that contain information such as load amounts, blast diagrams, timing configurations, "bad" or "problem" holes, and other "out of the ordinary" or pertinent information.
- Licensees and permit holders must keep all records pertaining to explosives, in permanent form, for not less than 5 years.
- License and permit documentation shall be kept current and displayed in conspicuous areas.
- Records of Employee Possessors and Responsible Persons must also be maintained and updated as needed.

A yearly close out and starting inventory will be taken and maintained as part of the permanent records required by the regulatory agencies (FCX verification required).

- Each site shall maintain daily blasting documentation (Blast Summaries) that contain information such as load amounts, blast diagrams, timing configurations, "bad" or "problem" holes, and other "out of the ordinary" or pertinent information.
- Licensees and permit holders must keep all records pertaining to explosives, in permanent form, for not less than 5 years.
- License and permit documentation shall be kept current and displayed in conspicuous areas.
- Records of Employee Possessors and Responsible Persons must also be maintained and updated as needed.

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Appendix A – Transportation Audit List
Explosives transportation audit will include:

- Proper placards visible in all four directions.
- Day boxes that are securely fastened to the vehicle or confined within the vehicle body to prevent spillage.
- Day boxes with explosives shall be locked in transit and on the pattern when product is not being unloaded.
- Vehicle loads that are within the rated vehicle carrying capacity.
- Non-sparking materials for container lining and fasteners.
- No other materials transported with explosives.
- Detonators transported on the same vehicle as explosives shall be placed in IME standard boxes.
- Vehicles will be equipped with two 20 pound multipurpose dry fire extinguishers.
- The volume and quantity of explosives shall not exceed the limits established by regulatory authorities.
- Means to control of inventory of explosives will be established.
- All working magazine areas shall be made secure with either a lockable gate and fence or lockable storage box for explosives, which will meet the requirements of the applicable agency.
- All magazines shall be designed to prevent vehicle impact to the magazine.
- The magazines shall be located in a proper manner to control surface drainage.
- Explosives refuse (empty boxes) shall be inspected, broken down and disposed of properly on site.

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Appendix B – Competency and Training (Future Development)

All employees and contractors who participate in drilling, sampling, blasting or support blasting activities shall be trained to effectively perform their duties. This training shall be documented.

Sites will develop a list of required skills and evaluate individuals to verify they are competent prior to participating in or supporting blasting activities. The skills shall include:

- Staking drill holes
- Duties of Responsible FCX Employee
- Duties of a lead blaster
- Duties of a sampler
- Conducting a pre-loading site inspection
- The identification of unique hazards for blast patterns
- Hole loading practices for routine and non-routine holes
- Magazine inventory control
- Safe transport of explosives
- Field inventory control
- Inventory reconciliation
- Guarding a shot overnight
- Establishing evacuation areas for blocking
- Effective blocking for a blast
- Post blast inspections
- Managing misfires or discovered explosives

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Appendix C – Blasting Safety Steering Team Requirements

The FCX Blasting Safety Steering Team (BSST) will evaluate existing standards, set new guidelines, and monitor site performance.

The BSST will consist of:

- Sponsor, GM level or Director Level
- Lead
- Site champions
- A health and safety representative

The company BSST will conduct regular audits at mine sites to monitor compliance, look for best practices, and provide feedback for continuous improvement. Audits will include review of compliance with corporate guidelines, training, SOPs, and field practices.

Quarterly meetings will be held with all members to review practices and make recommendations for change where needed. Changes to the current guidelines and appendices must go through a formal approval process with the company BSST and brought back to the site BSST for implementation.

Sites will establish a Site BSST with:

- Sponsor-Mine Manager
- The site champion
- A geotechnical engineer
- A health and safety representative
- A member of the site blasting crew

Supervisors at each site will be responsible to ensure that practices are being followed on a daily basis. Monthly audits of blasting practices will be completed for compliance and identification of improvement opportunities. These audits will include assessments of contractor work practices to ensure compliance with site blasting procedures and this guideline. A standard format will be used for the audits.

Sites will include blasting operations as part of the risk assessments, ISO, and OHSAS processes as applicable. Records will be maintained at each site for reference in audits.

11.4 Fall Protection

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Department of Health & Safety Guidelines	SOP NO.	FCX - 02
	REVISION NO.	0
	SUPERSEDES	
FALL PROTECTION	TASK CLASSIFICATION	Highly Critical / Critical / Non-Critical
APPROVAL DATE – 02/13/2009	ORIGINAL DATE – 02/13/2009	RELEVANT SOPS –

1. PURPOSE

To establish the requirements and procedures to protect employees and other persons conducting work at Freeport-McMoRan Copper & Gold properties from hazards associated with falling from one surface to another.

2. POLICY

The prevention of falls (i.e. Fall Restraint) through installation and maintenance of permanent barriers is preferred in locations where routine work is conducted (Refer to FCX Guarding, Flagging, Open Hole Permit Guideline). In situations where this is not feasible and during non-routine work, other protective systems described in this document shall be applied to prevent fall injuries.

Fall protection must be provided and used 100% of the time whenever persons are exposed to a fall hazard that could reasonably result in an injury to an employee working at height.

Persons climbing ladders of 20 feet or less may do so without fall protection as long as they maintain three points of contact at all times. Persons working on ladders may work without fall protection as long as their feet are not more than six feet from the ground, the ladder steps are dry and clean, the ladder is placed on a level surface, and the employee has effectively controlled remaining risks. Fall protection shall be used when working from ladders at any height if the employee is required to place himself in an off balanced position, increasing the fall potential. Employees, Competent Persons, and Supervisors must evaluate each situation using Consequence Thinking to minimize fall hazards and associated risks.

NOTE: All work involving ladders must meet company Ladder Safety requirements, including ladder positioning and securing of ladders.

All work and work locations shall be continually evaluated for fall hazard potential using consequence thinking techniques by those who perform work in these areas. When an unprotected fall hazard that could cause injury to an employee is identified, or if a violation of this procedure is encountered, work in that immediate area will cease until the hazard is controlled or violation corrected. When necessary, temporary guarding and flagging meeting the company procedure for guarding and flagging procedures will be installed to prevent exposure to the adjacent area below where work is being conducted.

3. SCOPE

All employees, contractors, and visitors on FCX property will comply with all elements of this fall protection procedure. Contractors working on the property may implement their own procedure that meets or exceeds this document's requirements.

4. RESPONSIBILITIES

Supervisors will ensure that their employees understand and follow this procedure, including training on the use and care of fall protection equipment. Employees will be provided with the equipment necessary to complete all

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work in compliance with this procedure. Supervisor's duties include evaluation of the work to be performed, determination of the means of protection that will be used, and adherence to this procedure. The supervisor must ensure daily, or more often if required, that the site conditions are safe for the employees to work at elevation. Supervisors will ensure that their employee's fall protection equipment is inspected in compliance with this procedure.

Employees will follow this procedure and notify their supervisor of any situations that do not comply with this procedure. Employees will be responsible for learning how to use their fall protection equipment properly, conduct a pre-use inspection, and for ensuring proper fit, care and maintenance of fall protection equipment.

Management will provide resources for employees to comply with this procedure. Resources include information, training, time, money and equipment.

Health and Safety Manager will provide or make available annual training for all employees who might reasonably be affected by this procedure. All training shall be documented, including course content. The H&S Manager will ensure that there is emergency response capability. Employees, Supervisors, and Competent Persons must work with the Health & Safety Department to evaluate rescue capabilities prior to engaging in activities in areas where rescue could be difficult.

Project Managers will ensure that contractors are informed of the procedure and that contractors understand the requirement for compliance with the procedure, including day to day oversight.

Competent person responsibilities include on-site evaluation to monitor safe work practices and procedures. A Competent Person is a person who has the training, knowledge, experience and authority to make decisions regarding fall hazards that affect the safety of others.

Qualified Person responsibilities include design and approval of engineered anchorage points and lifeline systems for fall protection. A Qualified Person is one who, by possession of a recognized degree, certificate, or professional standing, or who, by extensive knowledge, training, and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.

5. PROCEDURES

Permanent Guarding

Where routine work is conducted permanent guarding will be constructed and maintained. Permanent barriers will be constructed to support 200 pounds of horizontal force, and include a standard railing with standard toe board on all exposed sides. Permanent guarding will not be removed unless the fall hazard is eliminated by other means.

Fall Arrest Systems

Fall arrest systems may consist of: anchorage point, anchor device, shock absorbing lanyard, and body harness. In some cases horizontal or vertical lifelines are also included. These components are discussed below.

Harnesses

Full body harnesses with shoulder and leg straps are required. Employees will wear the size of harness recommended by the manufacturer based upon their physical dimensions. Persons greater than 300 lbs. must be evaluated for appropriate harness size and style.

Harnesses will be adjusted for proper fit each time they are used.

Body belts (a single belt around the waist) are not permitted as part of a fall arrest system.

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Lanyards

Lanyards and vertical life lines shall have a minimum breaking strength of 5,000 pounds.

Lanyards will not exceed six feet plus the shock absorber. Employees will wear ANSI approved fall arrest equipment only. Fall arrest equipment must be fitted to the size and weight of the user. Lanyards must be capable of sustaining a minimum tensile load of 3,000 pounds applied to the device with the lifeline or lanyard in the fully extended position.

Self-retracting lifelines and lanyards which do not limit free fall distance to 2 feet or less, shall be capable of sustaining a minimum tensile load of 5,000 pounds.

Persons should attach the lanyard to the anchor point as high as practical to minimize free fall. The shortest lanyard practical should be used. Swing during a fall will be minimized by working directly under the tie off point whenever possible. The fully extended length of the lanyard and deceleration device must be considered when choosing an anchor point.

Synthetic sling lanyards are preferred except for welders who will need wire rope lanyards under most applications.

All snap hooks will require double action to open.

Lanyards will not be attached to anchorage points by doubling back and attaching the snap hook to the lanyard unless approved by manufactures recommendations. Beam straps, beam clamps and other connectors designed for the specific purpose will be used when appropriate.

Body belts, harnesses, and components shall be used only for employee protection (as part of a personal fall arrest system or positioning device system) and not to hoist materials.

Personal fall arrest systems and components subjected to impact loading shall be immediately removed from service and shall not be used again for employee protection until inspected and determined by a competent person to be undamaged and suitable for reuse.

The employer shall provide for prompt rescue of employees in the event of a fall or shall assure that employees are able to rescue themselves.

Personal fall arrest systems shall be inspected prior to each use for wear, damage and other deterioration, and defective components shall be removed from service.

Body belts (as a positioning device only) shall be at least one and five-eighths (1 5/8) inches (4.1 cm) wide.

Personal fall arrest systems shall not be attached to guardrail systems, nor shall they be attached to hoists except as specified in other subparts of this Part.

When a personal fall arrest system is used at hoist areas, it shall be rigged to allow the movement of the employee only as far as the edge of the walking/working surface.

100 % fall protection may be provided by using two lanyards or a Y type lanyard.

Lanyards will be fastened to the back of the harness just below the shoulder blades except for specific applications associated with ladder climbing systems. Knots will not be tied in lanyards.

Shock-absorbing lanyards will not be used in combination with self- retracting lanyards.

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Anchorage Points / Tie-off Points

Anchorage points for fall arrest systems will be capable of supporting at least 5,000 pounds per person using the anchor point.

All field fabricated anchorage points will be designed, tested and installed under the supervision of a Qualified Person. Anchorages used to attach personal fall arrest systems will be independent of any anchorage being used to support or suspend platforms.

Guardrails and handrails will not be used as anchorage points unless they are specifically designed for that purpose.

When persons are unsure of the strength of an anchorage point they are using, they are required to contact their supervisor for assistance before connecting to it.

Horizontal Life Lines (static line)

Horizontal life lines may be installed by a competent person according to the manufacturer's requirements. Site-built systems must be designed and installed under the supervision of a Qualified Person.

A tag indicating the maximum number of persons permitted on a life line must be affixed to each accessible end of the life line.

Vertical Life Lines

Only one person may be connected to each vertical life line. If rope grabs are used, they must be specifically designed and approved by the manufacturer for attachment to the type and size of life line in use.

Work in Man Baskets and Lifts

Fall protection must be utilized per this procedure when conducting working from aerial platforms such as JLGs, man baskets, approved fork truck-mounted baskets, scissors lift platforms, etc. Employees must never work outside the guardrails. Employees must never climb or stand on a guardrail.

Nets

Nets may be applied only after other fall protection techniques have been attempted and found to be not feasible. Nets will be installed and maintained only by a competent person specifically trained in their use.

6. INSPECTION PROCEDURES

Pre- service Inspection

All fall protection equipment will be inspected prior to its use.

Pre-use Inspection and Disposal of Fall Arrest Equipment

Personal fall arrest systems will be inspected prior to each use for wear, damage and other deterioration. Defective or damaged components will be removed from service and made inoperable. Equipment missing the manufacturer's labels will be taken out of service unless the label is replaced by the manufacturer.

The user of fall protection will inspect their equipment immediately prior to use. During inspection the user will handle the equipment, operate its components and make a visual check. Inspection will follow the manufacturer's recommendation and will include inspection of:

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a) Braids and webbing
b) Stitching
c) Conditions of grommets, buckles, and hardware
d) Presence of manufacturer's date tag, and serial number
e) Harnesses and lanyards exposed to chemicals should be closely examined for deterioration and flexibility.
f) Cleanliness, broken strands, burns, excessive wear and dirt
g) Fall indicators (usually on self-retracting lifelines)

Cuts and frays that show red or any other color inside of a piece of webbing indicate that the component must be removed from service. Hardware that is twisted, bent or does not operate properly will be removed from service. Fall arrest components will be removed from service according to manufactures recommendations. Fall arrest components will be removed from service after they have been involved in a fall.

Periodic Inspections

Permanently installed fall arrest systems including horizontal and vertical lifelines, and trolley systems will placed on formal written preventative maintenance schedules in accordance with manufacturer's recommendations.

Storage of Fall Arrest Equipment

Fall arrest equipment will be stored in a manner that prevents exposure to chemicals, excessive sunlight and weather.

7. TRAINING

Awareness Training

All persons working on Freeport-McMoRan Americas property will be made aware of this procedure before working where fall protection may be needed. All persons who may be required to use fall protection will receive training as noted below. All training will be documented.

Pre-use Training

Persons using personal fall arrest systems will receive specific training by a competent person on the equipment they will be using. Training will include:

- This procedure
- Application of Consequence Thinking in the recognition, evaluation and control of falls
- The nature of fall hazards in the work area
- Inspection procedures
- Fitting procedures
- Limitations of fall arrest systems
- Tie off procedures and use of lanyards

Refresher Training

Affected employees will receive refresher training on the requirements of this procedure.

More frequent training may be required for any trained employee who demonstrates a lack of understanding of the requirements of this procedure.

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Rescue
Each facility will maintain or will contract for the capability to respond to an emergency. Employees, Competent Persons, and Supervisors should use personal rescue equipment in areas where rescue may be difficult (where a person may be suspended for more than six minutes).

In conditions that might result in difficulty rescuing a person who falls (i.e. extreme height or suspension over hazardous conditions), a rescue plan must be developed before beginning work.

Procedure Review

The FCX Department of Health and Safety will review this procedure periodically as practicable and revise when deemed necessary.

11.5 Scaffold Safety Checklist

Job Location:_____

Date assembled/moved/changed/dismantled:_____

Competent Person:_____

Scaffold Designation:_____

Competent Person on site and oversaw:

Set-up of Scaffold System		☐Yes	☐No ☐NA
Modification of Scaffold System	☐Yes	☐No	☐NA
Dismantling of Scaffold System	☐Yes	☐No	☐NA
Periodic Inspection of Scaffold System		☐Yes	☐No ☐NA
Scaffold is level, plumb, and solid	☐Yes	☐No	☐NA
Scaffold Grade Planking is used	☐Yes	☐No	☐NA
Planking has proper overlap		☐Yes	☐No ☐NA
Scaffold legs are sound and capable of carrying the maximum intended load			☐Yes ☐No ☐NA
Guardrails, mid-rails, toe-boards (as required) are properly installed on open sides	☐Yes	☐No	☐NA
Access ladder or equivalent safe access provided		☐Yes	☐No ☐NA
Have conditions caused by weather conditions been effectively addressed			☐Yes ☐No ☐NA
Has the scaffold been used by other groups (workers or trades)		☐Yes	☐No ☐NA
Is a tag line provided during hoisting of materials onto the scaffold		☐Yes	☐No ☐NA
Has the tag line been rated for capacity	☐Yes	☐No	☐NA
Scaffold system is assembled with appropriate parts		☐Yes	☐No ☐NA

Damaged scaffold members are to be immediately repaired or taken out of service and marked "DO NOT USE"

Comments:

Supervisor/Signature:_____/_____

11.6 Confined Space Guidelines

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Department of Health & Safety Guideline		GUIDELINE NO.	FCX - 05
		REVISION NO.	2
		SUPERSEDE	NAOM 004-01
Confined Spaces		TASK CLASSIFICATION	Highly Critical / Critical / Non-Critical
APPROVAL DATE – AUGUST 26, 2011	ORIGINAL DATE – JULY 21, 2009	RELEVANT SOPS –	

I. Purpose and Scope

To provide guidance for the health and safety of company and contract personnel entering and/or working in confined spaces on company property in accordance with 29 CFR 1910.146.

II. Definitions

Acceptable Entry Conditions: Conditions that must exist continuously in a confined space to allow entry and to ensure that employees involved with a confined space entry can safely enter into and work within the space.

NOTE: care must be taken to identify and evaluate the potential for conditions to change in the space resulting from work being done in the space (e. g. application of coatings; welding; removal of sludge; etc.)

Attendant: An individual stationed outside permit required confined spaces who monitors the authorized entrants and who performs all the attendant duties assigned in the confined space program (watch only one space at a time). This responsibility can be rotated. The attendant shall never break the plane of the entrance into the confined space nor shall they leave their post (unless relieved by another attendant or the entrants exit the space).

Authorized Entrant: An employee who will be entering the confined space and is aware of the hazards, PPE, and communication procedures prior to entry.

Emergency: Any occurrence (including any failure of hazard control or monitoring equipment) or event internal or external to the permit space that could endanger entrants.

Engulfment: The surrounding and effective capture of a person by a liquid or flowable solid.

Entry: The action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

Entry Permit: The written document provided by the entry supervisor to allow and control entry into a permit required space. Valid for one shift only; must be posted at the entrance of the space. A copy of the permit should be retained for one year for audit verification purposes.

Entry Supervisor: The person responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry, overseeing entry operations, and for terminating entry. The entry supervisor may or may not have the formal title of supervisor

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Note: An entry supervisor may also serve as an attendant or as an authorized entrant as long as that person is trained and equipped as an authorized entrant. Also the duties of the entry supervisor may pass from one individual to another during the course of the entry operation.

Hazardous Atmosphere: An atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue, injury or acute illness from one or more of the following:

1. Flammable gas, vapor, or mist greater than 10% of the lower flammable (explosive) limit (LFL or LEL);
2. Airborne combustible dust at a concentration that meets or exceeds its LFL; Note: This concentration may be approximated as a condition in which the dust obscures vision at a distance of 5 feet or less;
3. Atmospheric oxygen concentration below 19.5% or above 23.5%;
4 Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in Subpart G, Occupational Health and Environmental Control, or in Subpart Z, Toxic and Hazardous Substances, of this Part and which could result in employee exposure in excess of its dose or permissible exposure limit;
5. Any other atmospheric condition that is immediately hazardous to life or health (for example: heat).

Hot Work Permit: A written authorization to perform operations (for example, riveting, welding, cutting, burning, and heating) capable of providing a source of ignition.

IDLH (Immediately Hazardous to Life or Health) : Any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individuals ability to escape unaided from a permit required confined space.

Isolation: The control of all energy sources such that the potential for exposure does not exist. Examples of isolation may include: blanking of supply lines, a double block and bleed system, lockout/tagout/tryout of all sources of energy, and blocking or disconnecting all mechanical linkages.

LFL / LEL (Lower Flammable Limit / Lower Explosive Limit): The minimum concentration of a gas, vapor or dust in air (expressed in percent volume), which will ignite if an ignition source is present.

Non-Permit Confined Space: Non-Permit "Confined space" means a space that:

(1) Is large enough and so configured that an employee can bodily enter and perform assigned work; and

(2) Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry.); and

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(3) Is not designed for continuous employee occupancy..

Permit Required Confined Space: "Permit-required confined space (permit space)" means a confined space that has one or more of the following characteristics:

(1) Contains or has a potential to contain a hazardous atmosphere;

(2) Contains a material that has the potential for engulfing an entrant;

(3) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or

(4) Contains any other recognized serious safety or health hazard.

Qualified Person: An individual with combined education, training, experience, and process knowledge capable of recognizing, evaluating, and effectively identifying controls to reclassify confined spaces

Reclassification: A space classified as a permit-required confined space may be reclassified as a non-permit confined space under certain procedures where permit required definition hazards have been eliminated before work begins. Reclassification can be temporary or permanent—in either case, the change in status must be documented in writing and must follow the SOP for reclassification. See Section IV C for details.

Retrieval System: Equipment (including a retrieval line, full-body harness, wristlets if appropriate, and a lifting device or anchor) used for non-entry rescue of persons from permit spaces.

Serious Health or Safety Hazard: Any condition that poses an immediate or delayed threat to life, or that would cause irreversible health effects or that would interfere with an individual's ability to escape unaided from a permit space. Examples of hazards include: heat, electricity, falls.

III. Responsibilities/Duties

A. **Area Management** who control confined spaces or entries will:

1. Ensure compliance with this policy and procedure.
2. Ensure that all confined spaces within their division or areas under their control are identified (reviewed) and properly labeled; for example

Danger **Confined Space** **Follow Confined Space Procedure**	**Danger** **Permit Required Confined Space** **Follow Confined Space Procedure**

3. Once the permit required spaces have been surveyed and identified, management should include this inventory with site policy & procedure.
4. Conduct a hazard evaluation and risk analysis on these spaces. Please refer to example Forms CS-A and CS-B.

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5. Ensure that all persons involved with the confined space entry program are properly trained. This will include awareness training, task training for entrants, attendants, and entry supervisors, and training outlined in section V.

6. Provide necessary resources and equipment needed to implement and maintain the confined space entry program.

7. Ensure that Safe Operating Procedures and/or Job Safety Analysis have been written for each non-permit confined space that is entered by area employees.

8. Ensure that contractors working within confined spaces meet or exceed the requirements of this policy and procedure.

9. If it is determined that employees will not enter permit spaces, the Area Manager with take effective measures to prevent employees from entering the permit spaces.

10. Ensure that affected employees who are trained in confined space rescue practice making permit space rescues at least once every 12 months, by means of simulated rescue operations in which they remove dummies, manikins, or actual persons from the actual permit spaces or from representative permit spaces. Representative permit spaces shall, with respect to opening size, configuration, and accessibility, simulate the types of permit spaces from which rescue is to be performed.

11. Conduct an annual review of permit-required confined space entries and associated permits with the purpose of identifying problems or issues that have arisen and which need to be resolved going forward.

B. Entry Supervisors will:

1. Conduct the pre-entry meeting to ensure complete communication with all involved or impacted.

2. Ensure that the required atmospheric tests are performed in the confined space and results recorded on the permit prior to entry authorization. Ensure testing is conducted immediately prior to the entry to accurately reflect conditions at the time of entry

3. Verify that all procedures and equipment listed on the permit are in place.

4. Verify that rescue services have been notified as needed or determined based on exposures and are available and that the means for summoning them are operable.

5. Identify hazards within a confined space and hazards which may result from work activities within the space and ensure acceptable entry conditions exist initially and conditions remain acceptable throughout the duration of the entry.

6. Verify all training requirements for a specific confined space entry have been met.

7. Authorize entry by signing the Entry Authorization space on the entry permit after all conditions for safe entry have been met.

8. Post the completed, signed permit at the entrance to the space

9. Terminate the entry and cancel the permit when entry operations covered by the entry permit have been completed or when uncontrolled hazards arise in or near the permit space.

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10. In the event an IDLH condition is encountered refer to Section IX.

11. Maintain each original canceled permit for one year.

C. Attendants will:

1. Be familiar with the hazards of the confined space during the entry, including route of exposure (e.g., inhalation, absorption, etc.) signs, or symptoms, and consequences of over exposure.

2. Look for any behavioral changes as a result of the effects of exposure in authorized entrants.

3. Continuously maintain an accurate count of authorized entrants by name in the permit space.

4. Remain outside the permit space until relieved by another attendant, and/or job activities are completed.

5. Communicate with the authorized entrants as necessary to monitor entrant status and to alert the entrants of the need to evacuate the space.

6. Monitor activities inside and outside the space. Evacuate the space immediately when any one of the following takes place:

   a. The attendant detects a non acceptable entry condition (reference definitions).
   b. The attendant detects behavior changes.
   c. The attendant detects a situation outside the confined space that may endanger the authorized entrants.
   d. The attendant cannot effectively perform all the duties.
   e. Atmospheric monitor detects a hazardous atmosphere (reference definitions) or sounds an alarm of any type.

7. Summon rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from a permit space hazard.

8. Keep unauthorized personnel from entering or approaching the permit space.

9. Perform no duties that might interfere with the attendant's primary duty to monitor and protect authorized entrants.

10. An attendant must be present and tend the retrieval line when bins, hoppers, silos, tanks, and surge piles where unconsolidated material is stored, handled or transferred.

D. Entrants will:

1. Be familiar with the hazards of the confined space during the entry, including route of exposure (e.g., inhalation, absorption, etc.) signs, or symptoms, and consequences of over exposure.

2. Communicate with the attendant.

3. Alert the attendant whenever the entrant recognizes any warning sign or symptom of exposure to a hazardous situation, or the entrant detects a prohibited condition.

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4. Exit from the permit space whenever;

   a. The entrant recognizes any warning sign or symptom of exposure to a hazardous situation.
   b. The entrant detects a prohibited condition.
   c. The attendant orders to evacuate.
   d. A warning signal is given that means to evacuate.

5. Each authorized entrant into a permit required confined space shall use a full body harness at all times. A retrieval line should be attached to the safety harness when its use could assist with a possible rescue and it doesn't create an additional hazard during the entry. Wristlets may be used in lieu of full body harness if the entry supervisor determines the use of the full body harness is infeasible or creates a greater hazard and the use of wristlets is the safer alternative.
6. Entrants must don and utilize a lifeline, a harness or other means of affixing a lifeline when entering bins, hoppers, silos, tanks, and surge piles where unconsolidated material is stored, handled or transferred.

E. Health and Safety Department will:

1. Audit confined space entry program compliance.
2. Administer and maintain the Confined Space Entry Program including a comprehensive list of confined spaces.
3. Ensure atmospheric testing equipment is properly calibrated and maintained.
4. Coordinate specialty training in atmospheric testing and health hazards associated with confined space entry.
5. Maintain adequate rescue capability (on-site team, contract team) for all confined spaces on property.
6. Participate in annual review of program and cancelled permits.

F. Contract Personnel will:

1. Contractors working within confined spaces must meet or exceed the requirements of this policy and procedure.
2. Provide an attendant.
3. Conduct atmospheric monitoring using their equipment. Where the contractor has the capability to conduct monitoring using their equipment, they must provide proof of calibration of monitoring equipment before use.

NOTE: Atmospheric monitoring may be conducted by site personnel provided that arrangements have been made in advance, that there is agreement by all parties to do so, and that the resources are available to perform that function.

IV. Procedures

When entrance into a confined space is required, one of the procedures listed below must be followed (when in doubt, use the permit-required procedure).

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A. Entry Procedure for NON-PERMIT REQUIRED CONFINED SPACE

1. Entrants must evaluate the space using the hazards checklist on the Confined Space Entry Permit to ensure that there are no potential (existing or created by work activities in the space) or actual hazards in the space.
2. If potential or actual hazards exist, follow the permit-required confined space entry procedures. For example: if welding, torch cutting, burning, painting, applying solvents, or chemical cleaning will take place in the space.
3. Isolate or eliminate all energy sources that could enter the space according to the LOTOTO policy.
4. Prevent unauthorized or accidental entry into the space by placing temporary railing, cones or other devices around the space opening in accordance with the Freeport-McMoRan Barricading and Flagging policy.
5. Follow the written Safe Operating Procedure for the space being entered.
6. Document the basis for determining that all hazards in a permit space have been eliminated, through a certification that contains the date, the location of the space, and the signature of the person making the determination. The certification shall be made available to each employee entering the space or to that employee's authorized representative.

B. Entry Procedure for PERMIT-REQUIRED CONFINED SPACE

1. Designate authorized entrants, attendants, and an entry supervisor. These employees must be trained in confined space entry. At least two persons shall be assigned to confined space work with one person acting as the attendant outside the confined space. The attendant and entrants must remain in continuous communication with each other at all times.
2. Prevent unauthorized or accidental entry into the confined space by placing temporary railing, cones or other devices around the confined space opening. Follow the Freeport-McMoRan Barricading and Flagging policy.
3. Identify, evaluate, and control the energy sources of the permit space before employees enter.
4. The Entry Supervisor will perform a pre-task meeting for all Entrants, Attendants, and any other employees who may affect conditions of the confined space to explain the hazards, PPE required, testing and communication procedures.
5. Notify rescue services of planned entry.
6. Eliminate or control physical and chemical hazards by locking out, tagging, and testing all energy sources such as electricity, fluids, and mechanical energy. All pipes entering the space must be broken or double blocked and bled. Follow the Freeport-McMoRan LOTOTO policy.
7. Purge, inert, flush or ventilate the permit space as necessary to eliminate or control atmospheric hazards. These activities must be performed from outside the confined space. Ventilate continuously whenever the work inside the space will put contaminants into the air, example, sandblasting, painting, solvent cleaning, welding.

NOTE: Inerting the space will control the fire/explosion risk, but introduces an atmospheric hazard that is a risk for the entrant, and which may affect the operation of the test equipment. DO NOT enter this space

until consulting with your health and safety professional and determining appropriate measures and controls to proceed.

8. Test the atmosphere immediately prior to entry and conduct monitoring as described in Section VII of this guideline.

9. Provide the following equipment as necessary for safe work:
   a. Personal Protective Equipment, (skin, hearing, respiratory, eye protection),
   b. A full body harness at all times. A retrieval line should be attached to the safety harness when its use could assist with a possible rescue and it doesn't create an additional hazard during the entry. Wristlets may be used in lieu of full body harness if the entry supervisor determines the use of the full body harness is infeasible or creates a greater hazard and the use of wristlets is the safer alternative.
   c. Lighting equipment rated for explosive atmospheres if the potential for explosive atmospheres exist.
   d. Ladders, ramps or other effective means for proper egress, and
   e. Any other equipment necessary for safe entry into permit spaces.
   f. Testing and monitoring equipment (rated for explosive atmospheres, as applicable),
   g. Ventilation equipment, (rated for explosive atmospheres, as applicable
   h. Communication equipment, (rated for explosive atmospheres, as applicable
   i. Barriers and shelves, and
   j. Rescue and emergency equipment(rated for explosive atmospheres, as applicable

10. Ensure the communication system and rescue equipment is fully functional prior to entry.

11. Complete the permit and keep a copy posted at the space. A new permit must be completed at the start of each shift, when the entry crew changes. The permit will be updated when the safety or health conditions inside the space change during entry.

12. Provide at least one attendant outside the permit space for the duration of entry operations. The attendant must never leave the space while an entrant is in the confined space and must maintain continuous contact with the entrant. The attendant must not perform other work while acting as the attendant.

13. All entrants must immediately leave the space under the following conditions:
   a. Atmospheric monitor detects a hazardous atmosphere or fails. (reference definitions)
   b. An uncontrolled hazard is suspected or observed.
   c. An entrant experiences signs or symptoms of exposure to hazards.
   d. The communication link between the entrant and attendant is broken.
   e. When conditions outside the space threaten the entrants or attendant.
   f. The attendant calls for an evacuation.

14. If a rescue becomes necessary, activate the emergency response process. Remain outside the space; attempt remote retrieval if possible. If entry is necessary, prevent unauthorized personnel from attempting a rescue. Do not enter the space unless you are a trained rescuer, an attendant is present, and you have the proper personal protective equipment.

15. Notify the appropriate departments after entry operations are complete.

16. Review the entry operations to determine if measures taken were adequate to protect employees.

C. Procedure for Reclassification of PERMIT-REQUIRED CONFINED SPACE to NON-PERMIT-REQUIRED CONFINED SPACE

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1. If the permit space poses no actual or potential atmospheric hazards and if all hazards within the space are eliminated without entry into the space, the permit space may be reclassified as a non-permit confined space for as long as the hazards remain eliminated. (Control of atmospheric hazards through forced air ventilation does not constitute elimination of hazards.)

2. Based on the evaluation of the hazards, a qualified person shall classify the confined space as either a permit-required confined space (PRCS) or non-permit confined space (NPCS). All confined spaces shall be treated as permit spaces until determined to be otherwise.

3. A PRCS listed on in the inventory may be "reclassified" as a non-PRCS, by entry supervisor, if all hazards, atmospheric and non-atmospheric, are eliminated prior to entry.

4. Re-evaluation. NPCS's shall be periodically reevaluated to assure proper classification.

5. Any change of conditions in the space which introduces new hazards to the space, shall require an immediate re-evaluation of the space before entry.

V. Training

1. Confined Space Entry Training shall be provided to all employees entering confined spaces. The training shall consist of:

   a) This policy and procedure
   b) Relevant regulations and standards
   c) The use of all equipment for safe entry
   d) Air monitoring equipment use and procedures
   e) Emergency procedures
   f) Hazards of confined spaces
   g) Review of energy control procedures
   h) Roles and responsibilities of parties involved
   i) IDLH conditions – what might create an IDLH condition, and the requirements to work under IDLH conditions
   j) Locations of confined spaces in the employees' work area
   k) Emergency rescue/retrieval from confined spaces

2. Refresher training shall be provided to entrants, entry supervisors, and attendants annually and shall cover the topics above in a format that ensures that appropriate levels of knowledge continue. In addition, refresher training shall include information or "lessons learned" from the annual review of entries.

3. Awareness training shall be provided to all employees and shall consist of: informing employees that a policy and procedure exists and must be followed, recognition of confined spaces and confined space danger signs, and resources for further information.

4. Training shall be documented.

VI. Records

Employee Training Records
Confined Space Permit
Annual program review
Calibration Records
Equipment inspection records

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VII. Air Monitoring Procedure

Monitoring equipment shall be examined prior to use by performing a "bump test", checking batteries, alarm settings, and calibration dates, etc. Air monitoring equipment will be calibrated per the manufacturer's recommendations. A record will be kept by the individual making the calibration.

A. Prior to any person entering a permit required confined space, pre-testing of the atmosphere inside the confined space must take place. Testing may occur at various stages in the process (such as during ventilation to remove atmospheric hazards), but must be done immediately prior to entry. All confined space atmospheres must be pre-tested, in the following order:

1. Oxygen Deficiency: Confined spaces containing less than 19.5% oxygen shall be considered as oxygen deficient and hazardous. Entry shall not be made without self-contained breathing apparatus. Oxygen content over 23.5% shall be considered oxygen enriched and hazardous. Entry shall not be made.

2. Flammable gases: Flammable gases may be present in a confined space that contains acceptable levels of oxygen, and toxic levels below exposure limits. Flammable gases such as acetylene, butane, propane, hydrogen, hydrogen sulfide, methane, natural or manufactured gases or vapors from liquid hydrocarbons can be trapped in confined spaces, resulting in a flammable or explosive atmosphere. An atmosphere shall be considered as flammable or potentially flammable or explosive if pre-entry tests show a concentration greater than ten percent (10%) of the lower explosive limit (LEL) of the flammable gas.
Note: When oxygen concentrations are less than 10% the readings obtained for the LEL will be inaccurate or refer to the manufacturer's recommendations for the appropriate actions in such instances.

3. Toxicity: If a toxic substance is determined to be in the confined space a Material Safety Data Sheet (MSDS) or other chemical information shall be used to determine what type of personal protective equipment required, the potential health effects, the Permissible Exposure Limits, and any other information needed to safely conduct the work.

4. There may be no hazardous atmosphere within the space whenever any employee is inside the space.

B. All permit required confined space atmospheres must be pre-tested at a minimum of three levels (top, middle, bottom) prior to any entry. This is necessary for the potential for layering of heavy and light gases and vapors.

C. If a potentially hazardous atmosphere exists in a space, prior to opening the cover, test the atmosphere around the opening, then gradually release/open the access-way while testing—if conditions indicate a risk to the person conducting the evaluation, back away to a safe point, then resume testing once levels have reached safe values. Pre-testing of the atmosphere should be through small cover openings or by cracking open the cover and utilizing a probe suction line attachment with the monitoring instrument. Note: consult manufacturer's guidelines for delayed monitor response time when using probe suction lines

D. Whenever hazardous atmospheres are identified or experienced, such information must be recorded on the entry permit, and also referred to other departments who may have occasion to enter such space.

E. If work has been interrupted for any time, all air monitoring procedures outlined herein must be repeated before work is resumed.

F. Monitoring shall be continuous for all entries into permit-required confined spaces. Monitoring may be discontinued after the initial monitoring if it has been determined that none of the three atmospheric conditions (oxygen rich/deficient; toxic; > 10% of LEL/LFL) can exist or have a potential to exist. When testing for atmospheric conditions, test first for oxygen then for combustible gases and vapors, and then for toxic gases and vapors. Test at the upper, middle, and lower portions of the space. See Section VI for a detailed discussion NOTE: Continuous monitoring is necessary if:

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- The atmosphere hazards have not been completely eliminated.
- New or additional atmospheric hazards result from the tasks being performed in the space.
- Unacceptable atmospheric conditions can re-occur within the space due, for example, to the near-by processes or activities.

To discontinue monitoring, none of the three atmospheric conditions (oxygen rich/deficient; toxic; > 10% of LEL/LFL) can exist or have a potential to exist.
For larger or more complex situations, an alternative is to utilize individual monitors the entrant wears into the space.
Air sampling must be taken within the breathing zone of the entrant. The zone is defined as being within an 18" sphere surrounding the head of the entrant.

F.

G. If **a hazardous atmosphere is detected the space shall be immediately evacuated and evaluated to determine how the hazardous atmosphere developed. Re-entry can only occur once the source of the hazardous atmosphere has been identified and appropriately controlled to a safe level.**

VIII. Equipment Use

A. When work in wet or damp confined spaces is performed, all electrical equipment used shall be of a design so as to prevent moisture or water from accumulating in enclosures, circuit breakers, etc. To accomplish this, all connections, etc. shall be in "approved" enclosures. Ground fault interrupters shall be used.

B. Tanks or cylinders of compressed gases (acetylene, oxygen, etc) other than breathing air are prohibited in confined spaces. Hose extensions, etc. shall be used when welding or cutting is required. All welding leads and cutting torch hoses shall be removed from the space when not in use.

IX. IDLH Procedures

Confined spaces with an immediate danger to life and health (IDLH) should not be entered unless entry is a rescue by trained personnel. IDLH spaces are those spaces that have an atmosphere that is oxygen deficient (less than 19.5%) or enriched (greater than 23.5%), or a flammable mixture that's greater than 10% of the LEL, or when the toxins have reached their IDLH limits. An example of the latter would be an instrument reading of 100ppm SO2 (Sulfur Dioxide).

When all engineering efforts have been exhausted, including purging with air or an inert gas, ventilating, and an IDLH Space must still be entered for rescue of personnel or to prevent a severe or catastrophic event, the following steps must be taken.

1. Contact a Safety Professional/Specialist skilled in confined space entry to discuss the need for actually entering into the space. If entry is necessary due to a specified emergency (as noted above) then a plan of action will be developed and documented with a new permit.

2. Use of any electrical equipment in areas where a flammable atmosphere exists must be intrinsically safe. This determination is made during the pre-entry atmosphere survey. An atmosphere reading 10% of the lower explosive limit (LEL) shall be considered a flammable atmosphere for these purposes.

3. Separate rescue and emergency services must be staged at the immediate work site during any entry into a confined space with an IDLH atmosphere. Emergency responders must be adequately equipped and capable of responding.

4. The following personnel must be readily available: backup personnel with rescue equipment ready to provide assistance, and first aid support personnel with medical equipment and transportation.

5. The entry into an IDLH Confined Space will require a minimum of four individuals-two authorized entrants

and two attendants at the site. The attendants will provide the entrants with assistance; observe the entrants for signs of chemical heat, or other hazardous exposure, periodically check the integrity of the entrant's personal protective equipment/clothing, and notify emergency services if help is needed. One of the attendants must be rescue trained, and capable of providing basic first-aid including maintenance of the airway, control of bleeding, immobilization of fractures, CPR, and similar duties one may possibly need to enter the space. The other attendant will remain outside of the space performing the attendant duties and contact other emergency services as needed. The authorized entrants and attendants will need to have training and fit testing completed prior to entering IDLH Spaces with SCBA's.

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FORM CS-A

CONFINED SPACE SURVEY FORM

SPACE DESCRIPTION _____ DEPARTMENT _____

BUILDING OR LOCATION _____ NAME/EQUIPMENT # _____

DATE _____

PERSON(S) PERFORMING SURVEY _____ SIGNATURE _____

_____ SIGNATURE _____

_____ SIGNATURE _____

_____ SIGNATURE _____

SECTION I - CONFINED SPACE DETERMINATION		
YES	NO	IS THE " SPACE " LARGE ENOUGH AND SO CONFIGURED THAT AN EMPLOYEE CAN BODILY ENTER AND PERFORM ASSIGNED WORK : AND (**NOTE** : PRIMARILY INTENDED FOR FULL OR WHOLE BODY ENTRY)
		HAS LIMITD OR RESTRICTED MEANS FOR ENTRY OR EXIT (i.e. TANKS, VESSELS, SILOS, STORAGE BINS, HOPPERS, and VAULTS); AND (NOTE): DOORWAYS AND OTHER PORTALS THROUGH WHICH A PERSON CAN WALK ARE NOT CONSIDERED TO BE LIMITED MEANS FOR ENTRY OR EXIT.
		IS NOT DESIGNED FOR CONTINUOUS EMPLOYEE OCCUPANCY. (NOTE): A VENTED TELECOMMUNICATIONS VAULT WOULD BE DESIGNED FOR CONTINUOUS OCCUPANCY. AN UNVENTED VAULT WOULD NOT.
IF ALL THREE (3) ANSWERS ARE YES, THIS IS CLASSIFIED IS AS CONFINED SPACE, PROCEED TO SECTION II.		

SECTION II – DETERMINING PERMIT REQUIRED CONFINED SPACE		
YES	NO	CONTAINS OR HAS A POTENTIAL TO CONTAIN A HAZARDOUS ATMOSPHERE. (**NOTE** : EXPOSURES TO COMBUSTIBLE DUSTS OR FLAMMABLE MIXTURES, OXYGEN DEFICIENCIES, THAT MAY EXPOSE EMPLOYEES TO THE RISK OF DEATH, INCAPACITATION, ACUTE ILLNESS OR IMPAIR SELF RESCUE)
		CONTAINS A MATERIAL THAT HAS THE POTENTIAL FOR ENGULFING AN ENTRANT. (NOTE: PRIMARILY LIQUID OF FINELY DIVIDED (FLOWABLE) SOLID).
		HAS AN INTERNAL CONFIGURATION SUCH THAT AN ENTRANT COULD BE TRAPPED OR ASPHYXIATED BY INWARDLY CONVERGING WALLS OR BY A FLOOR WHICH SLOPES.
		CONTAINS ANY OTHER RECOGNIZED SERIOUS SAFETY OR HEALTH HAZARD. (NOTE): MAY INCLUDE RADIATION, NOISE, ELECTRICITY, AND MOVING PARTS OF MACHINERY.
IF ANY OF THE FOUR (4) ANSWERS IS YES, THIS IS CLASSIFIED AS A PERMIT REQUIRED CONFINED SPACE. COMPLETE A PERMIT SYSTEM FORM.		

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Attachment 10.2

FORM CS-B

CONFINED SPACE HAZARD IDENTIFICATION

(MEANS, PROCEDURES AND PRACTICES NECESSARY FOR SAFE PERMIT REQUIRED CONFINED SPACE ENTRY OPERATION).

PERMIT-REQUIRED CONFINED SPACE IDENT :	LEVEL OF RISK
EQUIPMENT TO BE WORKED ON :	Very High ( ) High ( ) Moderate ( ) Low ( )

POSSIBLE OR KNOWN HAZARDS AND RISKS

EXPLANATION OF HAZARD/RISK	
1.	OXYGEN (19.5 - 23.5) _____ %
.....	EXPLOSIVE (LEL) _____ %
.....	(LOWER FLAMMABILITY LIMITS = 10%)
	LIMITS
2.	TOXIC GASES ( ) _____ PPM
.....	( ) _____ PPM
.....	( ) _____ PPM
	OTHERS : GASES AND DUSTS
3.	....
.....	....
.....	....
.....	Extreme Temperature (Hot/Cold) .....
	VENTILATION _____
4.	MECHANICAL _____
	ELECTRICAL _____
.....	LINES _____
	FLUES _____
.....	RADIATION _____

REQUIREMENTS FOR ENTRY

1. STEPS TO REMOVE HAZARDS/RISK (i.e. Ventilation, Purging of process lines, Capping, Installation of Blank Plates, LOTO, HOT WORK Permit, Housekeeping, Barriers, etc.).
.....
.....
.....

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2. EQUIPMENT NEEDED (i.e. AIR LINES, LIFELINES, HARNESS, MECHANICAL APPARATUS, VENTILATION, RESPIRATORYPROTECTION, PROTECTIVE CLOTHING, RETRIEVAL SYSTEMS, BARRIERS, EXPLOSION PROOF EQUIPMENT, GROUND FAULT CIRCUIT INTERRUPTERS, ETC.
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3. FINAL ACTION TO ACHIEVE ACCEPTABLE ENTRY CONDITIONS AND FOR COMPLETING " ENTRY PERMIT " (i.e. TESTING ATMOSPHERIC CONDITION, ACCEPTABLE MEASUREMENT LEVELS, EQUIPMENT AVAILABLE, INSURING ENTRANTS AND ATTENDANTS ARE AWARE OF ACCEPTABLE ENTRY CONDITIONS, COMPLETION AND AUTHORIZATION OF THE PERMIT, ETC).
.....
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1. CONFINED SPACE ENTRY TRAINING CONFIRMED?
.....

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CONFINED SPACE ENTRY PERMIT

FOR RESCUE AND EMERGENCY SERVICES CALL 911

DEPARTMENT:	DATE:
EXACT LOCATION OF CONFINED SPACE:	
PURPOSE OF ENTRY:	CONFINED SPACE ID #:
SHIFT: DAY NIGHT	TIME PERMIT EXPIRES: (end of shift)
ENTRY SUPERVISOR NAME:	APPROVAL SIGNATURE:
ENTRY ATTENDANT(S) NAME(S):	
AUTHORIZED ENTRANT(S) NAME(S):	

Note: Enter N/A (not applicable) in the space for items that do not apply.

STEP 1 – ARE ENERGY SOURCES PRESENT?

YES	NO	HAZARD	YES	NO	HAZARD
		Pre-Opening Hazards			Lighting / Noise
		Oxygen Deficient / Enriched			Heat / Cold
		Flammables / Fire			Hot / Corrosive Materials
		Toxins			Biological Hazards
		Hazardous Energy			Conditions Outside Space
		Engulfment / Entrapment			Other
		Falls / Falling Objects			Other

If YES to any question, complete STEP 2.

If NO to all questions in Step 1, this space may be RECLASSIFIED a Non-Permit Required Confined Space.
Name _____ **Signature** _____

STEP 2 – PREPARATION PROCEDURES

PRE-ENTRY AIR TESTING			DONE	PROCEDURE	DONE	PROCEDURE
GAS	ACCEPTABLE	READING		Pre-Entry Checklist		Light / Noise
Oxygen	19.5 - 23.5 %			Oxygen Pre-Entry Reading		Heat / Cold
LEL	< 10 %			Chemical Cleanout Electrical		Hydraulic Isolation
Toxins	< PEL / TLV			Ventilation Purge Time		Radiation Protection
Other				Lock out / Tag out / Try out		Traffic Control / Barricading
Tester Name				Mechanical Isolation		Pneumatic Isolation
Test Instrument and #				Fall Protection		Hot Work Permit

If all conditions in Step 2 do not apply or have been eliminated, this space may be RECLASSIFIED a Non-Permit Required Confined Space. Name _____ **Signature** _____

REQUIRED EQUIPMENT

REQUIRED	EQUIPMENT	REQUIRED	EQUIPMENT
	Ventilator		Hand / Foot Protection
	Respirator		Body Protection
	Atmospheric Monitor		Ground Fault Provided
	Entrant / Attendee Communication		Lighting
	Harness		Sparkproof Tools
	Tripod		Ladder / Safe Access
	Eye Protection		Fire Extinguisher
	Hearing Protection		Intrinsically Safe Radio / Phone

ACCEPTABLE ENTRY CONDITIONS

DONE	ACTION	DONE	EQUIPMENT
	Review Permit w/Attendant and Entrant		All Safety Equipment Available
	Entry Permit Posted at Portal		MSDSs Reviewed
	Preparation / Isolation Procedures Done		Pre-Opening Hazards Eliminated
	Traffic Control / Barricading Done		Employees Task Trained
	Attendant/Entrant Communication Tested		Atmospheric Tests Satisfactory
	CSE Crew/Emergency Services Communications Tested		Surrounding Areas Free From Vapors and Other Hazards

ATMOSPHERIC MONITORING

GAS	ACCEPTABLE	TIME	READING	TIME	READING	TIME	READING
Oxygen	19.5 – 23.5 %						
LEL	<10%						
Toxins	< PEL / TLV						
Other							

LEL = Lower Explosive Limit
PEL = Permissible Exposure Limit
TLV = Threshold Limit Value
IDLH = Immediately Dangerous to Life or Health

Post Entry Cancellation of Permit by Supervisor _____

11.7 Hot Work & Permit Guidelines

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Department of Health & Safety Guideline	GUIDELINE NO.	FCX -06
	REVISION NO.	
	SUPERSEDE	NAOM 002-01
HOT WORK & PERMIT GUIDELINES	TASK CLASSIFICATION	Highly Critical / Critical / Non-Critical
APPROVAL DATE – NOVEMBER 5 2009	ORIGINAL DATE – JULY 22, 2009	RELEVANT SOPS –

1. PURPOSE

The purpose of this standard is to provide guidelines to ensure that appropriate measures have been taken to prevent fire and /or explosion during hot work activities being performed at areas not normally designed as "Fire Safe".

2. SCOPE

This standard applies to employees and other individuals (including temporary employees and contractor personnel), company's visitors, or other person(s) who work and/or are present in the workplace. Contract employees that have a hot work policy may use that policy as long as it meets or exceeds the protections provided in this guideline.

3. DEFINITIONS

Hot work –Work that has the potential of creating or becoming a source of ignition. This includes grinding, welding, thermal or oxygen cutting or heating, and other related heat or spark producing operations.

Permit – A document used to authorize hot work activity after necessary precautions have been taken to minimize the risk of adverse consequences associated with the work.

Authorized Personnel – Qualified persons who have been given the authority to approve and authorize hot work permits. The authorized personnel may delegate the responsibility for conducting the pre-hot work inspection to another qualified person but cannot delegate his/her accountability for the overall OH&S of the work being performed.

Qualified Personnel – Individuals with the knowledge, training, and experience to recognize, evaluate, and ensure adequate control of the hazards associated with hot work.

4. PROCEDURE

Required Areas

4.1. A hot work permit is required for hot work operations on or near operational processes or within 35 feet of flammable/combustible materials. Greater distances of up to 50 feet may be required where flammable gases or vapors may be present. Exceptions to the Hot Work Program may be allowed in areas designated as "fire safe". A fire safe designated area is an area specifically designed for hot work, such as welding shops, which are free of exposed combustibles. However, consideration must be given to those areas which may be in proximity to materials or processes which may migrate into the working area (such as flammable vapors or combustible dusts.) Where that potential exists, appropriate safety measures must be implemented (such as work stoppage or monitoring, or other effective means) Operations' department personnel may identify and document fire safe areas and tasks. Those areas, their identified tasks and associated SOPs will be kept on file.

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4.2. Operational areas that have known, but not obvious, combustibles should be posted with signage requiring application of the Hot Work Permit. Examples of these areas could be electrical installations, conveyor galleries, or machinery that contains rubber or plastic products. Departments should periodically survey the operational areas for hot work requirements.

4.3. High hazard areas such as fuel storage areas or explosive magazines have statutory requirements that must be followed when conducting hot work operations. Consult your safety department prior to beginning hot work operations in high hazard areas.

4.4. Areas that may require a Hot Work Permit include, but are not limited to:

- 4.4.1. Within 100 ft. of powder magazine or explosive or blasting storage area
- 4.4.2. Dust collectors, ductwork, and other areas where rubber linings or combustible dust exists
- 4.4.3. Public commercial buildings, warehouses, assay labs
- 4.4.4. SX/EW plants and related work areas
- 4.4.5. Above or adjacent to cable trays or electrical cables
- 4.4.6. Inside vessels or confined spaces
- 4.4.7. Hot work on vehicle fuel system or fuel tank regardless of location
- 4.4.8. Heavy equipment including haul trucks, shovels, drills, graders, dozers regardless of location where sparks or hot metal could contact combustible materials
- 4.4.9. Within 35 ft. of:
  - 4.4.9.1. Fuel storage areas or distribution lines
  - 4.4.9.2. Battery storage or charging areas
  - 4.4.9.3. Cooling towers
  - 4.4.9.4. Reagent storage
  - 4.4.9.5. Oxygen storage areas
  - 4.4.9.6. Sewer and septic systems
  - 4.4.9.7. Conveyor belting
  - 4.4.9.8. Tire storage areas
  - 4.4.9.9. Mobile fuel and lubrication trucks
  - 4.4.9.10. Storage/materials handling areas where combustible or flammable materials are present

Training

4.5. Individuals involved with hot work are trained in fire prevention and extinguisher use during initial training and refreshed annually. Additionally, individuals will be appropriately task trained for the work being conducted.

Precautionary Measures

4.6. Flammable and combustible materials within 35 ft. of hot work must be removed, covered with a fire-resistant/insulating material or otherwise protected. This includes combustible flooring and combustible debris on the floor.

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4.7. Openings or cracks in the walls, floors, or ducts that are potential travel passages for sparks, heat and flames must be covered or otherwise protected.

4.8. A fire extinguisher of the appropriate size and type must be provided at the site in addition to the normal placement of fire extinguishers.

4.9. In cases where the combustibles cannot be removed to provide at least 35 ft. of separation or other requirement cannot be completed, a control method must be described in the Alternative Means of Control section of the permit. Alternative control measures must provide equal or greater precautions to prevent fires. Standard Operating Procedures or JSA's should be developed for frequent tasks where alternative means of control is required (Examples: welding on lined ducts, welding on haul truck). The approved SOP/JSA is considered an alternative means of control.

4.10. When working near smoke detectors, alarm sensors or sprinkler systems, do not deactivate the entire alarm or sprinkler system. Isolate the detectors, sensors or sprinkler heads in the affected area to prevent false alarms or sprinkler system activation. At the completion of the work, ensure the device(s) is (are) returned to normal service conditions

4.11. A Fire Watch with knowledge of incipient stage fire fighting techniques must be appointed during performing hot work and for the duration 30 minutes after termination. Fire Watch is required when combustibles remain within 35 feet of the hot work and have not been controlled to eliminate the possibility of ignition. Each person assigned as Fire Watch must sign and date the permit.

NOTE: The work location must be assessed to determine where the fire risk may exist. A fire risk may result on the opposite side of a wall (or floor, etc.) due to heat transfer. Ensure that possible consequences are considered and that they are monitored by the Fire Watch as necessary to prevent a fire.

4.12. As the work progresses, periodic checks should be conducted to observe for fire, dust accumulation, adequate ventilation, atmospheric testing, or other hazardous conditions that could endanger the safety of the workers. If adverse conditions are observed, correct the hazards prior to continuing hot work. These checks should be made hourly, at a minimum.

4.13. Where there is a reasonable possibility of that flammable gases/vapors or excessive oxygen exist, atmosphere testing must be conducted by trained personnel as part of the permit process. Additionally, periodic checks should be conducted throughout the hot work process.

4.13.1. Lower Explosive Limit (LEL) or Lower Flammable Limit (LFL) must be below 10%

4.13.2. Oxygen (O_2) measurement must be between 19.5% and 23%

4.14. Containers holding flammable or combustible liquids or gasses must be purged, cleaned, and filled with inert liquid or gasses and tested to ensure that the LEL/LFL is below 10%

4.15. Do not conduct hot work operations until precautionary measures have been taken control the risk of unintended ignition.

Permit Issuance

4.16. Hot Work Permit process is initiated prior to beginning hot work by those who will be performing the work. Other precautionary policies must be considered in conjunction with hot work; such as LOTOTO, Confined Space Entry, etc. When the precautionary measures have been taken and the affected employees have signed the permit, the Authorized Person will sign the permit authorizing the work to proceed as described on the permit.

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4.17. Persons involved with the hot work or assisting with the hot work must sign the permit. Changes to the work environment or conditions affecting the hot work must be noted on the permit. The hot work permit must be kept at the job site until 30 minutes after the job is complete.

4.18. A Hot Work Permit is valid for one work shift and one task. The permit becomes invalid when the hot work is delayed for 90 minutes or more. Permits must be kept for at least 1 year or until released by an auditor for disposal or as directed by the records retention policy.

NOTE: The fire watch must ensure that a fire potential does not exist at the end of the mandatory 30 minute watch period. If material is perceptibly hot, is still glowing or otherwise providing indication of residual heat, the surface must be cooled by appropriate means, or the watch extended until such time as the risk has abated.

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Before signing this permit, think through the entire task and identify, evaluate and control energy sources. Safety precautions described in the *Hot Work Policy* must be followed. Every line on both sides must be completed. Not valid if work is delayed for 90 minutes or more.

Good for one shift only_____
date

WO No. _____

From_____AM/PM.To_____AM/PM

Bldg. or Area _____Dept._____
Floor_____

Work to be done _____

_____

_____

Work performed by_____

_____

_____

_____

Fire watch assigned? ☐ Yes ☐ No
Required, if uncovered combustibles remain within 35 feet.

Name (s) of fire watch_____

_____

_____

Time area is released by the Fire Watch:_____AM/PM

I verify that the work site has been inspected.

_____
Signatures of Persons Performing Work

_____
Signature of Area Supervisor or Designee

Emergency numbers/ Radio Channels

PH # _____

Comments

_____

_____

_____

_____

_____

_____

Work Area Evaluation

HOT WORK ON CONTAINERS & FUEL TANKS
Containers holding flammable or combustible liquids or gases have been purged, cleaned, and filled with inert liquid or gases and tested for %LEL/LFL.
_____ Initial when reading is taken and tested to verify an LEL/LFL less than 10%

HOT WORK IN ALL AREAS, INCLUDING THE ABOVE

1. Person completing "Hot Work Permit" understands hazards in the hot work zone.
   ☐ Yes ☐ No
2. Flame or spark-producing equipment to be used has been inspected and found to be in good repair.
   ☐ Yes ☐ No
3. Sprinklers and fire water, where provided, are in working condition and will remain in service while this work is being done.
   ☐ Yes ☐ No
4. Portable fire extinguishers are available, are appropriate for the fire hazard, and personnel have been trained to use them.
   ☐ Yes ☐ No
5. All combustibles have been relocated 35 feet from the hot work, and the remainder protected with flame-proof curtains or covers.
   ☐ Yes ☐ No
6. All voids and openings leading to other areas (rooms, floors) have been covered.
   ☐ Yes ☐ No
7. All appropriate SOPs and good work practices are being followed.
   ☐ Yes ☐ No
8. Do you have the proper personal protective equipment including welding shields, respirators, hearing protection for the job?
   ☐ Yes ☐ No
9. A method for contacting emergency responders is in place.
   ☐ Yes ☐ No

IF ANY ANSWER IS NO, LIST ALTERNATIVE MEANS OF CONTROL:

_____

_____

AIR TESTING REQUIRED FOR WORK NEAR FLAMMABLE LIQUIDS AND GASES

Oxygen level_____% LEL____% Time_____

Oxygen level_____% LEL____% Time_____

Oxygen level_____% LEL____% Time_____

Work must not proceed if oxygen level is above 23%, or the LEL is greater than 10% (note that oxygen must be above 19.5% in order to accurately measure LEL/LFL).

COMPLETE THIS SECTION AT END OF JOB.

Work completed Date & Time:_____
I verify the area has been monitored for the absence of fire for 30 minutes after the last cut.
Final Inspection by:_____
Time:_____

11.8 Supervisor's Incident Investigation Report

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SUPERVISOR'S INCIDENT INVESTIGATION REPORT

Important Notes:
1. This form shall be completed by Immediate Supervisor and/or Supervisor of work area where incident occurred
2. Use extra papers when you think you require more columns to write your report. Also, you may attach any relevant documents, photos, etc. as required
3. Submit the report to BU Head for data verification and approval. BU Head is responsible to submit the completed report to Safety.

IDENTIFYING INFORMATION

COMPANY OR DIVISION	DEPARTMENT	CREW	WORK SHIFT
EXACT LOCATION OF INCIDENT	DATE OF INCIDENT / TIME ☐ AM / ☐ PM	DATE OF REPORT	REPORTED BY:

INJURY /OCCUPATIONAL ILLNESS/NEAR MISS				PROPERTY DAMAGE / EQP INCIDENT/ FIRE/NEAR MISS			
NAME & ID	TITLE	PART OF BODY	NATURE OF INJURY	TYPE OF EQUIPMENT & NUMBER	OPERATOR NAME & ID	COST (US $) EST	COST (US $) ACTL

ENVIRONMENT (SPILLAGE) – OPTIONAL

Source of Spill:			Type of Spill:	
☐ Storage Tank	☐ Pipelines ☐ Mobile Equipment	☐ Refilling site ☐ Others:	☐ Petroleum Product ☐ Concentrate	☐ Hazardous Chemical ☐ Other

CAUSES OF SPILL:				
	☐ Human error ☐ Equipment failure	☐ Facility struck by ☐ Purposeful	☐ Natural Occurence ☐ Unknown/Other:	Quantity of Spill (ltrs):

RISK

EVALUATION OF LOSS POTENTIAL/RISK	CONSEQUENCE (Outcome of Event)	LIKELIHOOD (Probability or Frequency)
	☐ MAJOR ☐ SIGNIFICANT ☐ MODERATE ☐ MINOR	☐ ALMOST CERTAIN ☐ LIKELY ☐ POSSIBLE ☐ UNLIKELY

DESCRIPTION

DESCRIBE HOW THE EVENT OCCURRED (ACTIVITY BEING ATTEMPTED, ACCIDENT SEQUENCE, EMERGENCY RESPONSE)

CAUSES ANALYSIS

IMMEDIATE CAUSES: WHAT SUB-STANDARD ACTIONS AND/OR CONDITION CAUSED OR COULD CAUSE THE EVENT (See incident analysis in the following pages, write the number and description)	BASIC CAUSES: INDICATE WHAT BASIC CAUSES LEAD TO THE IMMEDIATE CAUSES (See incident analysis in the following pages, write the number and description)

ACTION PLAN

REMEDIAL AND PREVENTIVE ACTIONS: WHAT SHOULD BE DONE TO CONTROL THE CAUSE LISTED (as listed/described)	PIC	WHEN

INVESTIGATORS:

IMMEDIATE SUPERVISOR (NAME, ID, SIGNATURE & DATE)	AREA OHS REPRESENTATIVE (NAME, ID, SIGNATURE & DATE)

REVIEW

NAME AND SIGNATURE	DATE	COMMENT	NAME AND SIGNATURE	DATE	COMMENT
Reviewer # 1 (Area Supervisor)			Reviewer # 4 (Safety Mgr)		
Reviewer # 2 (Area Safety)			Reviewer # 5 (GM / VP) for Fatality or Damage/Spill $10,000US or more		
Reviewer # 3 (Supt/Dept Head)					

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BASIC/ROOT CAUSE ANALYSIS

CIRCLE CATEGORY NUMBERS FOR ENTRY INTO THE IMS (INCIDENT MANAGEMENT SYSTEM)

INJURY

1. PART OF BODY

1.1 Head	1.6 Face	1.11 Elbow	1.16 Chest	1.21 Buttocks	1.26 Ankle
1.2 Eye	1.7 Ear	1.12 Lower Arm	1.17 Abdomen	1.22 Groin	1.27 Foot
1.3 Nose	1.8 Neck	1.13 Wrist	1.18 Upper Back	1.23 Upper Leg	1.28 Toe
1.4 Tooth/Teeth	1.9 Shoulder	1.14 Hand	1.19 Lower Back	1.24 Knee	1.29 Internal
1.5 Jaw	1.10 Upper Arm	1.15 Finger	1.20 Hip	1.25 Lower Leg	1.30 Systemic

2. NATURE OF INJURY

2.1 Abrasion	2.6 Burn (chemical)	2.11 Crushing	2.16 Foreign body (embedded)	2.21 Hypothermia	2.26 Puncture
2.2 Allergy	2.7 Burn (electrical)	2.12 Cut/ Laceration	2.17 Foreign body (loose)	2.22 Inhalation	2.27 Shock
2.3 Amputation	2.8 Burn (heat)	2.13 Dislocation	2.18 Fracture	2.23 Irritation	2.28 Sprain / Strain
2.4 Bite / Sting	2.9 Concussion	2.14 Exhaustion	2.19 Headache	2.24 Obstruction	2.29 Suffocation
2.5 Bruise / Contusion	2.10 Crack / Chip	2.15 Food Poisoning	2.20 Hernia	2.25 Poisoning	2.30 Wound

CONTACT

3. AGENCY INVOLVED (choose only ONE)

3.1 Aircraft/Watercraft	3.6 Container	3.12 Fixed Walkway	3.18 Installation	3.23 Mechanical Power Transmission	3.28 Radiation/Radiating Substances
3.2 Animal/Wildlife	3.7 Conveyor	3.13 Gases	3.19 Ladder/Stair/Walkway	3.24 Obstruction	3.27 Sharp Edge
3.3 Boiler & Pressure Vessel	3.8 Dust	3.14 Hand Tools	3.20 Light Vehicle	3.25 Projectile	3.28 Stressing/Ground Pressure
3.4 Building/Structure	3.9 Electrical Apparatus	3.15 Heavy Equipment	3.21 Machinery		3.29 Working Surface
3.5 Chemicals	3.10 Elevator/Tram	3.16 Highly Flammable Hot	3.22 Material/Goods (wet muck, boulder, etc.)		
	3.11 Explosive Device	3.17 Hoisting Apparatus			

4. MECHANISM OF INJURY (choose only ONE)

4.1 Aggravation	4.7 Caught under or between (Crushed or Amputated)	4.10 Fall from elevation (To lower level)	4.13 Inhalation, Absorption, Swallowing	4.17 Shock / Arc / Flash
4.2 Bite or Sting	4.8 Contact with (Hot, Cold, Radiation, Chemical, Noise)	4.11 Fall from same level (Slip and fall, Trip over)	4.14 Lifting, Pulling, Pushing	4.18 Slip (not fall)
4.3 Blast	4.9 Exposure to temperature extremes	4.12 Foreign Bodies in eye (dust, chip, particle, etc)	4.15 Overexertion / Stress (Overload, Overexposure)	4.19 Struck against (Running, Bumping into)
4.4 Bodily Reaction			4.16 Rubbed or Abraded	4.20 Struck by / with (Hit by moving object)
4.5 Caught in (Pinch point)				
4.6 Caught on (Snag, Hung)				

IMMEDIATE CAUSES

5. SUBSTANDARD PRACTICES (choose only ONE)

5.1 Failure to follow rule or procedure	5.8 Failure to secure	5.15 Improper placement
5.2 Inadequate work area inspection	5.9 Operating at improper speed	5.16 Improper lifting
5.3 Inadequate pre-op inspection	5.10 Removing/defeating safety devices	5.17 Improper position for task
5.4 Inadequate assessment of risk	5.11 Using defective equipment	5.18 Horseplay
5.5 Failure to initiate corrective action	5.12 Using equipment improperly	5.19 Under influence of alcohol and/or other drugs
5.6 Operating without authority	5.13 Failing to use personal protective equipment	5.20 Unfit for duty
5.7 Failure to warn	5.14 Improper loading	

6. SUBSTANDARD CONDITIONS (choose only ONE)

6.1 Inadequate guards or barriers	6.6 Fire and explosion hazards	6.10 Radiation exposures
6.2 Inadequate or improper protective equipment	6.7 Poor housekeeping; disorderly workplace	6.11 High or low temperature exposures
6.3 Defective tools, equipment or materials	6.8 Hazardous environmental conditions: gases, dusts, smokes, fumes, vapors	6.12 Inadequate or excessive illumination
6.4 Congestion or restricted action	6.9 Noise exposure	6.13 Inadequate ventilation
6.5 Inadequate warning system		

BASIC/ROOT CAUSES

7. PERSONAL FACTOR (choose ONE or no more than TWO)

7.1 INADEQUATE PHYSICAL/PHYSIOLOGY CAPABILITY
- 7.1.1 Inappropriate height, weight, size, strength, reach, etc.
- 7.1.2 Restricted range of body movement
- 7.1.3 Limited ability to sustain body position
- 7.1.4 Limitation or incompatibility with assigned task (permanent disability)
- 7.1.5 Limitation or incompatibility with assigned task (temporary disability)
- 7.1.6 Substance sensitivities or allergies
- 7.1.7 Sensitivities to sensory extremes (temperature sounds, etc.)
- 7.1.8 Vision deficiency
- 7.1.9 Hearing deficiency
- 7.1.10 Other sensory (touch, taste, smell, balance)
- 7.1.11 Respiratory incapacity
- 7.1.12 Other permanent disabilities
- 7.1.13 Temporary disabilities

7.2 INADEQUATE MENTAL/PSYCHOLOGICAL CAPABILITY
- 7.2.1 Limitation or incompatibility with assigned task (permanent disability)
- 7.2.2 Limitation or incompatibility with assigned task (temporary disability)
- 7.2.3 Fears and phobias
- 7.2.4 Emotional disturbance
- 7.2.5 Mental illness
- 7.2.6 Intelligence level
- 7.2.7 Inability to comprehend
- 7.2.8 Poor judgment
- 7.2.9 Poor coordination
- 7.2.10 Slow reaction time
- 7.2.11 Low mechanical aptitude
- 7.2.12 Low learning aptitude
- 7.2.13 Memory failure
- 7.2.14 Inadequate initial training

7.3 PHYSICAL OR PHYSIOLGICAL STRESS
- 7.3.1 Injury or illness
- 7.3.2 Fatigue due to task load or duration
- 7.3.3 Fatigue due to lack of rest
- 7.3.4 Fatigue due to sensory overload
- 7.3.5 Exposure to health hazards
- 7.3.6 Exposure to temperature extremes
- 7.3.7 Oxygen deficiency
- 7.3.8 Atmospheric pressure variation
- 7.3.9 Constrained movement
- 7.3.10 Blood sugar deficiency
- 7.3.11 Drugs
- 7.3.12 Non-work related medical condition/medication

7.4 MENTAL OR PSYCHOLOGICAL STRESS
- 7.4.1 Emotional overload
- 7.4.2 Fatigue due to mental task load or speed
- 7.4.3 Extreme judgment/decision demands
- 7.4.4 Routine, monotony, demand for uneventful vigilance
- 7.4.5 Extreme concentration/perception demands
- 7.4.6 "Meaningless" or "degrading" activities
- 7.4.7 Confusing directions
- 7.4.8 Conflicting demands

7.5 LACK OF KNOWLEDGE
- 7.5.1 Lack of experience
- 7.5.2 Inadequate orientation
- 7.5.3 Inadequate initial training
- 7.5.4 Inadequate update training
- 7.5.5 Misunderstood directions

7.6 LACK OF SKILL
- 7.6.1 Inadequate initial instruction
- 7.6.2 Inadequate practice
- 7.6.3 Infrequent performance
- 7.6.4 Lack of coaching

7.7 IMPROPER MOTIVATION
- 7.7.1 Improper performance is rewarded
- 7.7.2 Proper performance is punished
- 7.7.3 Lack of incentives
- 7.7.4 Excessive frustration
- 7.7.5 Inappropriate aggression
- 7.7.6 Improper attempt to save time or effort
- 7.7.7 Improper attempt to gain attention
- 7.7.8 Inappropriate peer pressure
- 7.7.9 Inappropriate leadership example
- 7.7.10 Inadequate performance feedback
- 7.7.11 Inadequate reinforcement of proper behavior
- 7.7.12 Improper production incentives

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BASIC/ROOT CAUSES

8. JOB FACTORS (choose ONE or no more than TWO)

8.1 INADEQUATE LEADERSHIP AND/OR SUPERVISION
- 8.1.1 Unclear or conflicting reporting relationship
- 8.1.2 Unclear or conflicting assignment of responsibility
- 8.1.3 Improper or insufficient delegation
- 8.1.4 Giving inadequate policy, procedure, practices or guidelines
- 8.1.5 Inadequate work planning or programming
- 8.1.6 Inadequate instructions, orientation, and/or training
- 8.1.7 Providing inadequate reference documents, directives and guidance publications
- 8.1.8 Inadequate identification and evaluation of loss exposures
- 8.1.9 Lack of leader/management job knowledge
- 8.1.10 Inadequate matching of individual qualifications and job/task requirements
- 8.1.11 Inadequate performance measurement and evaluation
- 8.1.12 Inadequate or incorrect performance feedback

8.2 INADEQUATE ENGINEERING
- 8.2.1 Inadequate assessment of loss exposure
- 8.2.2 Inadequate consideration of human factors/ergonomics
- 8.2.3 Inadequate standards, specifications, and/or design criteria
- 8.2.4 Inadequate monitoring of construction
- 8.2.5 Inadequate assessment of operational readiness
- 8.2.6 Inadequate monitoring of initial operation
- 8.2.7 Inadequate evaluation of changes

8.3 INADEQUATE PURCHASING
- 8.3.1 Inadequate specifications on requisitions
- 8.3.2 Inadequate research on materials/equipment
- 8.3.3 Inadequate standards, specifications to vendors
- 8.3.4 Inadequate mode or route acceptance
- 8.3.5 Inadequate receiving inspection and acceptance
- 8.3.6 Inadequate communication of safety and health data
- 8.3.7 Improper handling of materials
- 8.3.8 Improper transportation of materials
- 8.3.9 Inadequate identification of hazardous items
- 8.3.10 Inadequate salvage and/or waste disposal

8.4 INADEQUATE MAINTENANCE
- 8.4.1 Inadequate preventative - assessment of needs
- 8.4.2 Inadequate preventative - lubrication and servicing
- 8.4.3 Inadequate preventative - adjustment/assembly
- 8.4.4 Inadequate preventative - cleaning or resurfacing
- 8.4.5 Inadequate reparative - communication of needs
- 8.4.6 Inadequate reparative - scheduling of work
- 8.4.7 Inadequate reparative - examination of units
- 8.4.8 Inadequate reparative - part substitution

8.5 INADEQUATE TOOLS AND EQUIPMENT
- 8.5.1 Inadequate assessment of needs and risks
- 8.5.2 Inadequate human factors/ergonomics considerations
- 8.5.3 Inadequate standards or specifications
- 8.5.4 Inadequate availability
- 8.5.5 Inadequate adjustment/repair/maintenance
- 8.5.6 Inadequate salvage and reclamation
- 8.5.7 Inadequate removal and replacement of unsuitable items

8.6 INADEQUATE WORK STANDARDS

(Inadequate development of standards)
- 8.6.1 Inadequate inventory and evaluation of exposures and needs
- 8.6.2 Inadequate coordination with process design
- 8.6.3 Inadequate employee involvement
- 8.6.4 Inadequate/inconsistent standards/procedures/rules

(Inadequate communication standards)
- 8.6.5 Inadequate publication
- 8.6.6 Inadequate distribution
- 8.6.7 Inadequate translation to appropriate languages

(Inadequate maintenance standards)
- 8.6.8 Inadequate tracking of work flow
- 8.6.9 Inadequate updating
- 8.6.10 Inadequate monitoring use of standards/procedures/rules

8.7 WEAR AND TEAR
- 8.7.1 Inadequate planning of use
- 8.7.2 Improper extension of service life
- 8.7.3 Inadequate inspection and/or monitoring
- 8.7.4 Improper loading or rate of use
- 8.7.5 Inadequate maintenance
- 8.7.6 Use by unqualified or untrained people
- 8.7.7 Use for wrong purpose

8.8 ABUSE OR MISUSE
- 8.8.1 Condoned by supervision – intentional
- 8.8.2 Condoned by supervision – unintentional
- 8.8.3 Not condoned by supervision – intentional
- 8.8.4 Not condoned by supervision – unintentional

MANAGEMENT CONTROL

9. MANAGEMENT CONTROL (SYSTEMS, STANDARDS, COMPLIANCE)

For each basic/root cause identified, refer to the management systems below to assist in determining your corrective action to eliminate and/or improve Management Control

9.1 EMPLOYEE DEVELOPMENT
- 9.1.1 Training needs regularly analyzed
- 9.1.2 Training materials developed/formalized
- 9.1.3 Training provided to new employees
- 9.1.4 Training regularly updated
- 9.1.5 Refresher training
- 9.1.6 Training records maintained
- 9.1.7 Instructor qualifications
- 9.1.8 Competency evaluations conducted
- 9.1.9 Training effectiveness measured/monitored

9.2 EMPLOYEE ACCOUNTABILITY
- 9.2.1 Accountability system established/formal
- 9.2.2 Roles/expectations for all job classes
- 9.2.3 Accountability measurement systems
- 9.2.4 Accountability evaluations regularly conducted
- 9.2.5 Accountability in place for negative/positive behavior

9.3 RISK/CHANGE MANAGEMENT
- 9.3.1 Risks identified
- 9.3.2 Risks analyzed and rated
- 9.3.3 Risk controls identified
- 9.3.4 Risk action plan
- 9.3.5 Risks mitigated (ALARP)
- 9.3.6 Risk measurement/monitoring system
- 9.3.7 Change management identification system
- 9.3.8 Change management identification process
- 9.3.9 Change management communication process
- 9.3.10 Risk/change management employee involvement

9.4 COMMUNICATIONS
- 9.4.1 Communications for entire audience
- 9.4.2 Top– down – up communications
- 9.4.3 Task instructions
- 9.4.4 Personal contacts
- 9.4.5 Group employee meetings
- 9.4.6 Audited for effectiveness/timeliness

9.5 INSPECTIONS/AUDITS
- 9.5.1 Planned general inspection process
- 9.5.2 Workplace examination process
- 9.5.3 Equipment inspection process
- 9.5.4 Job/Task observation process
- 9.5.5 Management involvement
- 9.5.6 Employee involvement
- 9.5.7 Corrective action follow-up process
- 9.5.8 Effectiveness measured/monitored
- 9.5.9 Evaluation for practices and conditions

9.6 EMERGENCY PREPAREDNESS
- 9.6.1 Administrative roles established
- 9.6.2 Identification of potential emergencies
- 9.6.3 Written emergency plans
- 9.6.4 Emergency contact information
- 9.6.5 Emergency teams trained
- 9.6.6 Emergency equipment available
- 9.6.7 Coordination with outside agencies
- 9.6.8 Emergency evacuation drills
- 9.6.9 Employee emergency training

9.7 POLICIES/GUIDELINES/JSA'S/SOP'S/WI'S
- 9.7.1 Developed for jobs/tasks
- 9.7.2 Available to employees
- 9.7.3 Reviewed as part of job training
- 9.7.4 Reviewed before job/tasks begin
- 9.7.5 Reviewed/revised regularly

9.8 CONTRACTORS/MATERIALS MANAGEMENT
- 9.8.1 Written policy/procedures established
- 9.8.2 Procurement of goods and services include safety reviews
- 9.8.3 H&S review of contractor selection
- 9.8.4 Onsite management of contractors
- 9.8.5 H&S review of incoming services
- 9.8.6 H&S training of contractors
- 9.8.7 System/training in place for MSDS

9.9 ENGINEERING/DESIGN
- 9.9.1 Regulations/codes followed
- 9.9.2 Hazard/risk identification conducted
- 9.9.3 H&S review of projects
- 9.9.4 H&S analysis conducted
- 9.9.5 Operational/work process controls in place

9.10 OPERATIONS & MAINTENANCE
- 9.10.1 Preventative maintenance system in place
- 9.10.2 Critical processes/parts identified/reviewed
- 9.10.3 Pre-use equipment process in place
- 9.10.4 Work order system in place

9.11 OCCUPATIONAL HEALTH
- 9.11.1 Hazard identification/evaluation/controls in place
- 9.11.2 IH monitoring in place and conducted
- 9.11.3 Information and training in place
- 9.11.4 Medical surveillance conducted
- 9.11.5 Recordkeeping tracked and maintained

9.12 HUMAN ENGINEERING
- 9.12.1 Ergonomic designed equipment in place
- 9.12.2 Ergonomic reviews conducted
- 9.12.3 Ergonomic education provided
- 9.12.4 Fatigue factors identified
- 9.12.5 Fatigue awareness training provided

9.13 HUMAN RESOURCES
- 9.13.1 Job capability requirements evaluated and established
- 9.13.2 Pre-placement exam provided
- 9.13.3 New hire skills analysis completed
- 9.13.4 General orientation/training conducted
- 9.13.5 Pre-employment qualification checks made
- 9.13.6 Mentoring systems in place

9.14 ENVIRONMENTAL
- 9.14.1 Spill release reporting/controls in place

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11.9 Team Root Cause Analysis Incident Investigation Report

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TEAM ROOT CAUSE ANALYSIS
INCIDENT INVESTIGATION REPORT

I. BRIEF SUMMARY OF INCIDENT

II. BACKGROUND AND DETAILS OF INCIDENT

III. PERSONNEL AND EQUIPMENT INVOLVED IN THE INCIDENT

1. Personnel Information (Involved)

Name:		Employee ID #:	
Job Title:		Date of Hire:	
# Years Experience in Current Position:			
Immediate Supervisor:			
Incident History:			

2. Immediate Supervisor's Information

Name:		Employee ID #:	
Job Title:		Date of Hire:	
# Years Experience in Current Position:			
Immediate Supervisor:			
Incident History:			
Activity at Time of Incident:			
Location at Time of Incident:			

3. Witness Information (Direct)

Name:		Employee ID #:	
Job Title:		Department:	
Immediate Supervisor:			
Activity at Time of Incident:			
Location at Time of Incident:			

4. Witness Information (Indirect)

Name:		Employee ID #:	
Job Title:		Department:	
Immediate Supervisor:			
Activity at Time of Incident:			
Location at Time of Incident:			

5. Equipment

Property Type:	
Property ID Number:	
Function of Property:	

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6. Spilled Materials (Optional)

Name/Source of Spill:	
Type: (flammable, toxic, etc.)	
Quantity of Spill:	

IV. CHRONOLOGICAL EVENTS OF THE INCIDENT

1.

V. FACT FINDING (CRITICAL FACTORS)

1.

VI. ROOT CAUSES ANALYSIS

1. Immediate Causes: SUBSTANDARD PRACTICES

Comments:

2. Immediate Causes: SUBSTANDARD CONDITIONS

Comments:

3. Basic/Root Causes: PERSONAL FACTORS

Comments:

4. Basic/Root Causes: JOB FACTORS

Comments:

5. Management Control (System, Standards, Compliance)

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Comments:

VII. ACTION PLAN TO PREVENT RECURRENCE

#	Action Item	Person Responsible	Start Date	Complete Date	Comments
1					
2					
3					
4					
5					

VIII. INVESTIGATION TEAM/COMMITTEE

	Print Name	*Signature*
Team Leader		
Member		
Member		
Member		
Member		

IX. ACTION PLAN EFFECTIVENESS CHECK

Assigned to:		
Due Date:		
This Section To Be Completed After Due Date		
Plan Effective?		
Revised Action Items: *(if necessary)*		
Check Completed:	*Print Name*	*Signature*

ATTACHMENTS: (photos, statements, sketches, maps, forms, etc.)

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BASIC/ROOT CAUSE ANALYSIS

CIRCLE CATEGORY NUMBERS FOR ENTRY INTO THE IMS (INCIDENT MANAGEMENT SYSTEM)

INJURY

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1.4 Tooth/Teeth	1.9 Shoulder	1.14 Hand	1.19 Lower Back	1.24 Knee	1.29 Internal
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3.4 Building/Structure	3.9 Electrical Apparatus	3.15 Heavy Equipment	3.21 Machinery		3.29 Working Surface
3.5 Chemicals	3.10 Elevator/Tram	3.16 Highly Flammable Hot	3.22 Material/Goods (wet muck, boulder, etc.)		
	3.11 Explosive Device	3.17 Hoisting Apparatus			

4. MECHANISM OF INJURY (choose only ONE)

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4.2 Bite or Sting	4.8 Contact with (Hot, Cold, Radiation, Chemical, Noise)	4.11 Fall from same level (Slip and fall, Trip over)	4.14 Lifting, Pulling, Pushing	4.18 Slip (not fall)
4.3 Blast	4.9 Exposure to temperature extremes	4.12 Foreign Bodies in eye (dust, chip, particle, etc)	4.15 Overexertion / Strain (Overload, Overexposure)	4.19 Struck against (Running, Bumping into)
4.4 Bodily Reaction			4.16 Rubbed or Abraded	4.20 Struck by / with (Hit by moving object)
4.5 Caught in (Pinch point)				
4.6 Caught on (Snag, Hung)				

IMMEDIATE CAUSES

5. SUBSTANDARD PRACTICES (choose only ONE)

5.1 Failure to follow rule or procedure	5.8 Failure to secure	5.15 Improper placement
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5.3 Inadequate pre-op inspection	5.10 Removing/defeating safety devices	5.17 Improper position for task
5.4 Inadequate assessment of risk	5.11 Using defective equipment	5.18 Horseplay
5.5 Failure to initiate corrective action	5.12 Using equipment improperly	5.19 Under influence of alcohol and/or other drugs
5.6 Operating without authority	5.13 Failing to use personal protective equipment	5.20 Unfit for duty
5.7 Failure to warn	5.14 Improper loading	

6. SUBSTANDARD CONDITIONS (choose only ONE)

6.1 Inadequate guards or barriers	6.6 Fire and explosion hazards	6.10 Radiation exposures
6.2 Inadequate or improper protective equipment	6.7 Poor housekeeping; disorderly workplace	6.11 High or low temperature exposures
6.3 Defective tools, equipment or materials	6.8 Hazardous environmental conditions: gases, dusts, smokes, fumes, vapors	6.12 Inadequate or excessive illumination
6.4 Congestion or restricted action	6.9 Noise exposure	6.13 Inadequate ventilation
6.5 Inadequate warning system		

BASIC/ROOT CAUSES

7. PERSONAL FACTOR (choose ONE or no more than TWO)

7.1 INADEQUATE PHYSICAL/PHYSIOLOGY CAPABILITY

- 7.1.1 Inappropriate height, weight, size, strength, reach, etc.
- 7.1.2 Restricted range of body movement
- 7.1.3 Limited ability to sustain body position
- 7.1.4 Limitation or incompatibility with assigned task (permanent disability)
- 7.1.5 Limitation or incompatibility with assigned task (temporary disability)
- 7.1.6 Substance sensitivities or allergies
- 7.1.7 Sensitivities to sensory extremes (temperature sounds, etc.)
- 7.1.8 Vision deficiency
- 7.1.9 Hearing deficiency
- 7.1.10 Other sensory (touch, taste, smell, balance)
- 7.1.11 Respiratory incapacity
- 7.1.12 Other permanent disabilities
- 7.1.13 Temporary disabilities

7.2 INADEQUATE MENTAL/PSYCHOLOGICAL CAPABILITY

- 7.2.1 Limitation or incompatibility with assigned task (permanent disability)
- 7.2.2 Limitation or incompatibility with assigned task (temporary disability)
- 7.2.3 Fears and phobias
- 7.2.4 Emotional disturbance
- 7.2.5 Mental illness
- 7.2.6 Intelligence level
- 7.2.7 Inability to comprehend
- 7.2.8 Poor judgment
- 7.2.9 Poor coordination
- 7.2.10 Slow reaction time
- 7.2.11 Low mechanical aptitude
- 7.2.12 Low learning aptitude
- 7.2.13 Memory failure
- 7.2.14 Inadequate initial training

7.3 PHYSICAL OR PHYSIOLGICAL STRESS

- 7.3.1 Injury or illness
- 7.3.2 Fatigue due to task load or duration
- 7.3.3 Fatigue due to lack of rest
- 7.3.4 Fatigue due to sensory overload
- 7.3.5 Exposure to health hazards
- 7.3.6 Exposure to temperature extremes
- 7.3.7 Oxygen deficiency
- 7.3.8 Atmospheric pressure variation
- 7.3.9 Constrained movement
- 7.3.10 Blood sugar deficiency
- 7.3.11 Drugs
- 7.3.12 Non-work related medical condition/medication

7.4 MENTAL OR PSYCHOLOGICAL STRESS

- 7.4.1 Emotional overload
- 7.4.2 Fatigue due to mental task load or speed
- 7.4.3 Extreme judgment/decision demands
- 7.4.4 Routine, monotony, demand for uneventful vigilance
- 7.4.5 Extreme concentration/perception demands
- 7.4.6 "Meaningless" or "degrading" activities
- 7.4.7 Confusing directions
- 7.4.8 Conflicting demands

7.5 LACK OF KNOWLEDGE

- 7.5.1 Lack of experience
- 7.5.2 Inadequate orientation
- 7.5.3 Inadequate initial training
- 7.5.4 Inadequate update training
- 7.5.5 Misunderstood directions

7.6 LACK OF SKILL

- 7.6.1 Inadequate initial instruction
- 7.6.2 Inadequate practice
- 7.6.3 Infrequent performance
- 7.6.4 Lack of coaching

7.7 IMPROPER MOTIVIATION

- 7.7.1 Improper performance is rewarded
- 7.7.2 Proper performance is punished
- 7.7.3 Lack of incentives
- 7.7.4 Excessive frustration
- 7.7.5 Inappropriate aggression
- 7.7.6 Improper attempt to save time or effort
- 7.7.7 Improper attempt to gain attention
- 7.7.8 Inappropriate peer pressure
- 7.7.9 Inappropriate leadership example
- 7.7.10 Inadequate performance feedback
- 7.7.11 Inadequate reinforcement of proper behavior
- 7.7.12 Improper production incentives

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BASIC/ROOT CAUSES

8. JOB FACTORS (choose ONE or no more than TWO)

8.1 INADEQUATE LEADERSHIP AND/OR SUPERVISION
- 8.1.1 Unclear or conflicting reporting relationship
- 8.1.2 Unclear or conflicting assignment of responsibility
- 8.1.3 Improper or insufficient delegation
- 8.1.4 Giving inadequate policy, procedure, practices or guidelines
- 8.1.5 Inadequate work planning or programming
- 8.1.6 Inadequate instructions, orientation, and/or training
- 8.1.7 Providing inadequate reference documents, directives and guidance publications
- 8.1.8 Inadequate identification and evaluation of loss exposures
- 8.1.9 Lack of leader/management job knowledge
- 8.1.10 Inadequate matching of individual qualifications and job/task requirements
- 8.1.11 Inadequate performance measurement and evaluation
- 8.1.12 Inadequate or incorrect performance feedback

8.2 INADEQUATE ENGINEERING
- 8.2.1 Inadequate assessment of loss exposure
- 8.2.2 Inadequate consideration of human factors/ergonomics
- 8.2.3 Inadequate standards, specifications, and/or design criteria
- 8.2.4 Inadequate monitoring of construction
- 8.2.5 Inadequate assessment of operational readiness
- 8.2.6 Inadequate monitoring of initial operation
- 8.2.7 Inadequate evaluation of changes

8.3 INADEQUATE PURCHASING
- 8.3.1 Inadequate specifications on requisitions
- 8.3.2 Inadequate research on materials/equipment
- 8.3.3 Inadequate standards, specifications to vendors
- 8.3.4 Inadequate mode or route acceptance
- 8.3.5 Inadequate receiving inspection and acceptance
- 8.3.6 Inadequate communication of safety and health data
- 8.3.7 Improper handling of materials
- 8.3.8 Improper transportation of materials
- 8.3.9 Inadequate identification of hazardous items
- 8.3.10 Inadequate salvage and/or waste disposal

8.4 INADEQUATE MAINTENANCE
- 8.4.1 Inadequate preventative - assessment of needs
- 8.4.2 Inadequate preventative - lubrication and servicing
- 8.4.3 Inadequate preventative - adjustment/assembly
- 8.4.4 Inadequate preventative - cleaning or resurfacing
- 8.4.5 Inadequate reparative - communication of needs
- 8.4.6 Inadequate reparative - scheduling of work
- 8.4.7 Inadequate reparative - examination of units
- 8.4.8 Inadequate reparative- part substitution

8.5 INADEQUATE TOOLS AND EQUIPMENT
- 8.5.1 Inadequate assessment of needs and risks
- 8.5.2 Inadequate human factors/ergonomics considerations
- 8.5.3 Inadequate standards or specifications
- 8.5.4 Inadequate availability
- 8.5.5 Inadequate adjustment/repair/maintenance
- 8.5.6 Inadequate salvage and reclamation
- 8.5.7 Inadequate removal and replacement of unsuitable items

8.6 INADEQUATE WORK STANDARDS

(Inadequate development of standards)
- 8.6.1 Inadequate inventory and evaluation of exposures and needs
- 8.6.2 Inadequate coordination with process design
- 8.6.3 Inadequate employee involvement
- 8.6.4 Inadequate/inconsistent standards/procedures/rules

(Inadequate communication standards)
- 8.6.5 Inadequate publication
- 8.6.6 Inadequate distribution
- 8.6.7 Inadequate translation to appropriate languages

(Inadequate maintenance standards)
- 8.6.8 Inadequate tracking of work flow
- 8.6.9 Inadequate updating
- 8.6.10 Inadequate monitoring use of standards/procedures/rules

8.7 WEAR AND TEAR
- 8.7.1 Inadequate planning of use
- 8.7.2 Improper extension of service life
- 8.7.3 Inadequate inspection and/or monitoring
- 8.7.4 Improper loading or rate of use
- 8.7.5 Inadequate maintenance
- 8.7.6 Use by unqualified or untrained people
- 8.7.7 Use for wrong purpose

8.8 ABUSE OR MISUSE
- 8.8.1 Condoned by supervision – intentional
- 8.8.2 Condoned by supervision – unintentional
- 8.8.3 Not condoned by supervision – intentional
- 8.8.4 Not condoned by supervision – unintentional

MANAGEMENT CONTROL

9. MANAGEMENT CONTROL (SYSTEMS, STANDARDS, COMPLIANCE)

For each basic/root cause identified, refer to the management systems below to assist in determining your corrective action to eliminate and/or improve Management Control

9.1 EMPLOYEE DEVELOPMENT
- 9.1.1 Training needs regularly analyzed
- 9.1.2 Training materials developed/formalized
- 9.1.3 Training provided to new employees
- 9.1.4 Training regularly updated
- 9.1.5 Refresher training
- 9.1.6 Training records maintained
- 9.1.7 Instructor qualifications
- 9.1.8 Competency evaluations conducted
- 9.1.9 Training effectiveness measured/monitored

9.2 EMPLOYEE ACCOUNTABILITY
- 9.2.1 Accountability system established/formal
- 9.2.2 Roles/expectations for all job classes
- 9.2.3 Accountability measurement systems
- 9.2.4 Accountability evaluations regularly conducted
- 9.2.5 Accountability in place for negative/positive behavior

9.3 RISK/CHANGE MANAGEMENT
- 9.3.1 Risks identified
- 9.3.2 Risks analyzed and rated
- 9.3.3 Risk controls identified
- 9.3.4 Risk action plan
- 9.3.5 Risks mitigated (ALARP)
- 9.3.6 Risk measurement/monitoring system
- 9.3.7 Change management identification system
- 9.3.8 Change management identification process
- 9.3.9 Change management communication process
- 9.3.10 Risk/change management employee involvement

9.4 COMMUNICATIONS
- 9.4.1 Communications for entire audience
- 9.4.2 Top – down – up communications
- 9.4.3 Task instructions
- 9.4.4 Personal contacts
- 9.4.5 Group employee meetings
- 9.4.6 Audited for effectiveness/timeliness

9.5 INSPECTIONS/AUDITS
- 9.5.1 Planned general inspection process
- 9.5.2 Workplace examination process
- 9.5.3 Equipment inspection process
- 9.5.4 Job/Task observation process
- 9.5.5 Management involvement
- 9.5.6 Employee involvement
- 9.5.7 Corrective action follow-up process
- 9.5.8 Effectiveness measured/monitored
- 9.5.9 Evaluation for practices and conditions

9.6 EMERGENCY PREPAREDNESS
- 9.6.1 Administrative roles established
- 9.6.2 Identification of potential emergencies
- 9.6.3 Written emergency plans
- 9.6.4 Emergency contact information
- 9.6.5 Emergency teams trained
- 9.6.6 Emergency equipment available
- 9.6.7 Coordination with outside agencies
- 9.6.8 Emergency/evacuation drills
- 9.6.9 Employee emergency training

9.7 POLICIES/GUIDELINES/JSA'S/SOP'S/WI'S
- 9.7.1 Developed for jobs/tasks
- 9.7.2 Available to employees
- 9.7.3 Reviewed as part of job training
- 9.7.4 Reviewed before job/tasks begin
- 9.7.5 Reviewed/revised regularly

9.8 CONTRACTORS/MATERIALS MANAGEMENT
- 9.8.1 Written policy/procedures established
- 9.8.2 Procurement of goods and services include safety reviews
- 9.8.3 H&S review of contractor selection
- 9.8.4 Onsite management of contractors
- 9.8.5 H&S review of incoming services
- 9.8.6 H&S training of contractors
- 9.8.7 System/training in place for MSDS

9.9 ENGINEERING/DESIGN
- 9.9.1 Regulations/codes followed
- 9.9.2 Hazard/risk identification conducted
- 9.9.3 H&S review of projects
- 9.9.4 H&S analysis conducted
- 9.9.5 Operational/work process controls in place

9.10 OPERATIONS & MAINTENANCE
- 9.10.1 Preventative maintenance system in place
- 9.10.2 Critical processes/parts identified/reviewed
- 9.10.3 Pre-use equipment process in place
- 9.10.4 Work order system in place

9.11 OCCUPATIONAL HEALTH
- 9.11.1 Hazard identification/evaluation/controls in place
- 9.11.2 IH monitoring in place and conducted
- 9.11.3 Information and training in place
- 9.11.4 Medical surveillance conducted
- 9.11.5 Recordkeeping tracked and maintained

9.12 HUMAN ENGINEERING
- 9.12.1 Ergonomic designed equipment in place
- 9.12.2 Ergonomic reviews conducted
- 9.12.3 Ergonomic education provided
- 9.12.4 Fatigue factors identified
- 9.12.5 Fatigue awareness training provided

9.13 HUMAN RESOURCES
- 9.13.1 Job capability requirements evaluated and established
- 9.13.2 Pre-placement exam provided
- 9.13.3 New hire skills analysis completed
- 9.13.4 General orientation/training conducted
- 9.13.5 Pre-employment qualification checks made
- 9.13.6 Mentoring systems in place

9.14 ENVIRONMENTAL
- 9.14.1 Spill release reporting/controls in place

11.10 HDPE Pipe Handling Guidelines

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Department of Health & Safety Guideline		GUIDELINE NO.	FCX - 12
		REVISION NO.	1
		SUPERSEDE	New (4/08/11)
HDPE Pipe Handling Guidelines		TASK CLASSIFICATION	Highly Critical / Critical / Non-Critical
APPROVAL DATE – 8/02/11	ORIGINAL DATE – 4/08/11	RELEVANT SOPS – SITE SPECIFIC	

1. Background

In 2010, an AMES Construction contractor employee working in the mine was installing a section of 24-inch HDPE pipe. An existing 24-inch pipe was being used as a skid to guide the new pipe into position with the new pipe riding on top of the existing pipe. The contractor was helping to pull the pipe back to the ground using lifting straps placing him less than 4-feet away from the pipe being moved and directly in the pipe's path of movement. The pipe impacted the contractor in the upper body. He suffered fatal injuries.

Also in 2010, employees were fusing 12-inch HDPE pipe to tie into an existing line. While positioning the pipe for fusion, the stored energy created during the pulling and bending of the pipe resulted in the 12-inch pipe suddenly being projected over the stationary pipeline towards the employee who was standing between a piece of equipment and the stationary pipe. The pipe struck the employee in the face and head causing serious injuries.

As a result of these and other serious incidents with HDPE pipe a team developed these important guidelines to prevent a similar event from occurring.

2. Purpose and Scope

This guideline applies to all Freeport-McMoRan employees and contractors who handle High Density Polyethylene (HDPE) pipe 3 inches in diameter or larger **and** greater than 50 feet in length, including deliveries of new pipe at any length.

3. Definitions

- HDPE Pipeline Handling Permit (Appendix A) – a permit that is required for all work with HDPE pipe (3" or larger and greater than 50 feet in length) where pipe will be pulled, installed, and/or repaired. The permit is not required for off-loading of pipe. The permit is good for the task duration as long as conditions don't change (ie., weather, equipment, pipe size, terrain, slope, etc.). One permit may be used for multiple jobs that are the same. The permit must be reviewed each time prior to work beginning. If conditions change at any time a new permit is required.
- Exemption Form (Appendix B) – used when work falls outside of the guidelines listed here. An exemption requires an engineering review of the work to be performed and a manager approval prior to beginning the work. An exemption may be used each time the task is performed as long as the conditions haven't changed (i.e, the equipment utilized, pipe size, terrain or slope are different, etc.). Exemptions that affect all sites will be reviewed by the PSST for possible addition to this guideline.
- Pipe Safety Steering Team (PSST) – a team comprised of representatives from each area/site affected by this guideline. A company PSST oversees the guidelines for each FCX business unit and a site PSST ensures practices are being followed for each site.
- Project Lead – a person that is intimately familiar with the task. This could be a supervisor, engineer leading the project, or other qualified person.

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- Qualified Person – a person that has demonstrated competence according to the skills assessment and has documented training.
- Safety Watch – a qualified person that is assigned to monitor a task and stop work if people place themselves in a potential line of fire. The site will determine if a safety watch is needed for a task based on the risk assessment for that task. If the safety watch is necessary, the person **must remain on the job at all times and have no other job assignments or responsibilities**. If this person must leave the area there will be positive relief by another qualified person.
- Spotter – a person assigned to assist or direct the flow of work for someone performing a task such as unloading or moving pipe.
- Substantial Barrier – an object placed between the pipe and personnel that is able to withstand the force of a pipe to prevent personnel from being struck. Examples may include: dirt berms, concrete barriers, properly placed equipment, etc.

4. Risk Management

Tasks involving HDPE pipe handling will be listed on each site's risk register and an evaluation to reduce or eliminate risk will be completed according to the FCX Risk Matrix. The following guidelines will also be followed by each site.

- An HDPE Pipe Permit (See Appendix A) will be completed for any task involving HDPE pipe pulling/moving, installation, and/or repair.
- An evaluation will be completed as part of the permit process to determine if a task requires a designated safety watch. If required, the safety watch must remain on the job at all times and have no other job assignments or responsibilities. If a person must leave the area, there must be positive relief with another qualified person.
- A load/move chart for each piece of equipment will be used to assist decisions for safe handling of pipe. This will include site-specific equipment used for pipe handling.
- An engineering review will be completed to determine if substantial barriers are needed and ensure they are adequate to protect workers in the area.
- Pulling of HDPE pipe will be used over pushing unless an exemption is approved. (See Appendix B).
- A Preventative Maintenance (PM) will be established for inspection of pipes utilizing the site's existing PM process. Inspections shall be performed for issues such as sagging, ground erosion, etc. as well as for condition of equipment used for pipe handling (bullets, slings, shackles, etc.).

5. Training

All employees and contractors who handle or participate in the handling of HDPE pipe will receive specific training on the hazards associated with HDPE pipe. Employees will be trained to effectively complete and use the HDPE Pipe Permit.

Sites will utilize site specific training as well as the skills assessments developed by PSST to evaluate individuals and verify competency prior to working with HDPE pipe. The skills shall include safe operation of equipment and hazard identification and control procedures. Training will be interactive and consist of classroom, video, and/or field demonstration of the task. Employees must demonstrate competency (verbal and visual) to assess understanding. All training will be documented and a training matrix with employee skills will be kept within the Division.

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At a minimum the training will include these key elements:

- Use of the HDPE Pipe Permit
- Determination of safe distances to position employees from pipe during movement or after movement and proper use of substantial barriers.
- Appropriate actions to be taken for piping that is found to contain residue or solution.
- Specific rigging task training for pipe handling and pulling.
- Off-loading, loading, and storage of HDPE pipe.
- HDPE pipe pulling and handling.
- Fusing HDPE pipe.
- Inspections of pipe and prevention of hazards and failures.
- Incident review and potential hazards and problem areas.
- Mobile equipment used for HDPE pipe handling.

Safety skill assessments developed by the PSST will be utilized to qualify individuals to train/mentor others, perform tasks and complete permits for the following key areas:

- HDPE Pipe Handling Guidelines
- HDPE Pipe Handling Permit
- General Equipment HDPE Pipe Handling
- General Pipe Selection and Identification
- HDPE Pipe Unloading, Loading, and Storage
- Pulling pipe
- Rigging Equipment
- Pipeline PM and Inspection
- HDPE Pipe Unrolling
- Flow Isolation and Distribution
- Fusing and Fusing Equipment

Existing site documents and skill assessment formats may be utilized but must include the skills listed in the FCX safety skill assessments.

6. Receiving, Off-loading, and Storage

Each site will establish Safe Operating Procedures (SOPs) for receiving, off-loading, and storage of pipe to ensure that:

- A load inspection checklist has been completed to verify the load has been shipped according to company shipping requirements. (See Appendix D.)
- An HDPE Pipe Unloading Checklist (Appendix D) is completed for off-loading prior to beginning the task.
- A 50-foot safe zone around the truck is established and marked, and a safety watch is in place to keep people out of the unloading/loading zone. The truck driver will remain with the safety watch until the off-loading is complete.
- Site trucks/trailers used to move pipe sticks are equipped with engineered stints or other engineered means of securing the load.

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- Barriers or other means of preventing a line of fire issue are in place when un-strapping a load, such as using a loader with forks to block the load.
- The site must ensure that equipment has been evaluated to ensure adequate lifting capacity and that the person operating the equipment is aware of the limitations.
- Employees have documented task training to safely operate equipment used in loading/unloading pipe under the existing task training process.
- Employees unloading pipe have completed documented rigging task training where a mobile crane is used.
- Employees handling pipe have documented pipe handling task training.
- Receiving or warehouse personnel coordinate the safe arrival of the shipping truck with the operations employees and trucks will not be off-loaded until proper loading is verified utilizing the Freeport McMoRan loading guidelines and the Load Inspection Checklist (Appendix D). If a truck is not loaded properly the load will be rejected or an exemption and engineering review will be completed prior to off-loading.
- A signed copy of the load inspection checklist will be sent with the driver and presented to operations employees (or persons unloading) prior to unloading.
- HDPE pipe is stored no more than two pipes high for 10" diameter or larger and no more than two feet for smaller diameter, unless there are engineering controls in place to control the possibility of a stack collapsing.

7. Pulling/Moving Lengths of Pipe

- An HDPE Pipe Permit will be completed prior to pulling/moving pipe.
- Each site will establish SOPs for pulling/moving of HDPE.
- All equipment used for pipe pulling/moving will meet the load specifications in Appendix C or an exemption approval is required.
- For 12-inch pipe and larger the site shall use pipe rigging as outlined in Appendix C. If the rigging is not listed in Appendix C an exemption is required. Rigging and pulling procedures for pipe less than 12" will be defined in site SOPs.
- The use of a sling as a "choker" is NOT acceptable for pulling/moving an HDPE pipeline of a diameter 12-inch or larger unless an exemption is approved. This includes pulling lengths of pipeline while fusing in a fusing lay down area. It is however, acceptable to use a sling to lift and position pipe (ex., positioning a pipeline in a fusing machine or removing it from the fusing machine).
- Pipe-slotting, or cutting a slot or shape in the pipeline, to be used as an anchor point for pulling/moving an HDPE pipeline of a diameter of 12-inch or larger is NOT acceptable unless an exemption is approved. Approved equipment for pulling is listed in Appendix C.
- All ground personnel must be positioned out of the line of fire while pipe is being pulled or moved. If the minimum distance of 50 feet cannot be met then substantial barriers must be utilized.
- Safety watchers and blockers will be established for pulling/moving of pipe on haul roads or where there is potential for interaction with other traffic as determined by risk assessment of the task.
- Pipe pulls will NOT exceed grades greater than 17.5% without an approved exemption.

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- Escorts and trailing vehicles must be used if pipe pulling occurs in active mining areas. Scheduling and communication of pipe movement activities must be completed.
- Equipment used to guide the pipe must be appropriate for the size and potential energy of the pipe as determined by Appendix C and/or an engineering review.
- Pipe bending creates additional stored energy that must be considered when completing tasks to ensure minimum safe distances and provide substantial barriers where needed.

8. Installation and Repair

- Sites will prepare SOPs for installation and repair jobs with HDPE pipe.
- An HDPE permit will be completed prior to beginning pipe installation and repair by a qualified person.
- A pre-job safety review meeting will be completed with all employees involved in the task.
- For new installations, an engineering review will be conducted to evaluate pipe placement and site logistics.
- A Management of Change (MOC) evaluation is required for any new installation or significant modification to a pipe system, as outlined in the site MOC.
- When cutting pipe with significant bends an engineering review is required. A pre-job safety meeting will also be held to discuss hazards and precautions to prevent an incident.
- Dual-contained or dual-walled pipe may require different rigging specific to the pipe and task. An exemption and engineering review is required for these tasks.
- Sites that receive pipes on rolls will develop an SOP for unrolling and issue a permit (Appendix A) prior to conducting the work.
- It is important to remember that banding clamps are not designed to splice the ends of two pipes together and cannot prevent axial pipe movement. These pipes should be fused or secured with a coupling designed for this application.

9. Monitoring and Control

The company Pipe Safety Steering Team (PSST) will evaluate existing standards, set new guidelines, and monitor site performance.

The PSST will consist of:

- Sponsor, GM level or Director Level
- Lead, Manager level
- Site champions
- A Global Sourcing representative
- A health and safety representative
- Engineering representative

The company PSST will conduct regular audits at each branch to monitor compliance, look for best practices, and provide feedback for improvement. Audits will include review of compliance with corporate guidelines, training, SOPs, and field practices.

Quarterly meetings will be held with all members to review practices and make recommendations for change where needed. Changes to the current guidelines and appendices must go through a

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formal approval process with the company PSST and be brought back to the site PSST for implementation.

Sites that regularly handle HDPE pipe will establish a PSST with:

- The site champion (member of company PSST)
- An engineering representative
- A GSC representative
- A health and safety representative
- A representative from each affected area

Sites that handle HDPE pipe on a minimal basis or as part of short duration projects will utilize expertise from other sites to assist with review of the project and implementation of the guidelines prior to work commencing.

Supervisors at each site will be responsible to ensure that practices are being followed on a daily basis. Monthly audits of pipe handling practices will be completed for compliance and identification of improvement opportunities. Sites will audit work practices of contractors that perform HDPE pipe work to ensure compliance with site HDPE pipe procedures and this guideline.

Pipe handling management will be part of each site's risk assessments, ISO, and OHSAS processes as applicable. Records will be maintained at each site for reference in audits.

Records of permits will be maintained in the area of responsibility for a period of five years.

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Before completing the permit it is necessary to thoroughly review applicable policies and SOP's with all affected employees to ensure concrete understanding. Think carefully about the entire task to identify, evaluate, and control all energy sources and prevent incidents . This permit is not required for off-loading of pipe.

Date:	Time:	Project Lead:	Permit Requestor:
Department/Shop:		Location of Activity:	
Purpose of Activity:			
Pipeline Contents:		Pipeline Destination: From:	To:

1. Pipeline Handling Hazard Analysis	**Yes**	**No**	**N/A**
Are all personnel working on this task properly trained to perform this task?	☐	☐	☐
Does the pipe length or route of travel require spotters or blockers?	☐	☐	☐
Has the travel path been communicated?	☐	☐	☐
If the pipe will be pulled has the appropriate equipment been identified for the task?	☐	☐	☐
If pipe must be pushed have steps been identified to control energy or exposure to the energy? (exemption required)	☐	☐	☐
If path of travel has potential to create bends in the pipe have steps been identified to control energy or exposure?	☐	☐	☐
Are substantial barriers required to protect personnel?	☐	☐	☐
Is the pipe line buried or earth work needed?	☐	☐	☐
Is a Blue Stake Permit Required?	☐	☐	☐
Has the Pipeline Been Isolated? **LOTOTO Points:**	☐	☐	☐
Is a Hot Work permit required?	☐	☐	☐
Have notifications been given to other affected Departments?	☐	☐	☐
Have the contents of the pipe been identified and appropriate Environmental and Safety actions taken?	☐	☐	☐
Is a safety attendant necessary for the protection of employees from potential stored energy due to job scope?	☐	☐	☐
Have all cut points been clearly marked and initialed by Supervisor or Designated Qualified Individual?	☐	☐	☐
Have all tie-in points been clearly marked and initialed by Supervisor or Designated Qualified Individual?	☐	☐	☐
Have all energized lines near the work area been clearly identified and marked?	☐	☐	☐
Has appropriate equipment been identified per the load chart? **Equipment Used:**	☐	☐	☐
Is appropriate pulling or lifting rigging available and been inspected?	☐	☐	☐
Have area access issues been identified and controls put in place?	☐	☐	☐
If contractors are used have they been approved and received adequate training	☐	☐	☐
Name of Contractor used:			

2. Energy Source Review (if the anwer to any question is yes, list hazard controls)

No	Yes	Hazard	Description of Hazard and Control Measures
		High walls or material at natural angle of repose	
		Active pipelines in close proximity	
		Traffic in the area	
		Weather (wind, heat, cold, etc.)	
		Lighting	
		Heavy equipment being used	
		Material handling hazards	
		Falls or falling objects	
		Pre-work hazards	
		Any others? If so, what?	

Designated Qualified Person Approval to Begin Daily Work (Signature):

Supervisor Approval to Begin Daily Work (Signature):

	Yes	**No**
Is the Pipeline 12" diameter or greater?	☐	☐
Does the path of travel have the potential to create bends in the pipe that will store significant potential energy?	☐	☐
If either of the next two questions is "Yes", an exemption form must be reviewed by engineering and signed by the Division Manager:		
Will the pipeline be pushed into place?	☐	☐
Does the job scope fall outside the guidelines of Appendix C?	☐	☐

If the answer to any of the four above questions is YES, then a Superintendent signature is required

Superintendent Approval to Begin Project Work and As Conditions Change (Signature):

Contractor Supervisor Approval to Begin Daily Work (Signature):

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Appendix B – HDPE Pipe Handling Area Exemption Request

Please fill out the following form with a detailed description of the area and reason for an HDPE pipe handling exemption request. An engineering review must be completed prior to submitting to the division manager. Approval from the division manager or higher is required prior to proceeding with task.

Date:	Time:	Division Manager:
Location of Activity:		
Purpose of Activity:		
Description of Request:		
Engineer Conducting Review:		
Justification:		
Control Measures:		
Signature of Requestor:		
Signature of Division Manager or Delegate:		
*When completed give a copy of all related documentation to the division record keeper for filling purposes.		

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Appendix C - HDPE Pipe Pulling Guidelines

Table C.1 - HDPE Pipeline Pulling Force

Nominal Pipe Diameter (inches)	Pipe SDR Rating 32.5	26	21	19	17	15.5	13.5	11	9	7 or 7.3
12	2,600	3,200	4,000	4,400	4,800	5,300	6,000	7,200	8,500	10,500
14	3,200	3,900	4,800	5,200	5,800	6,300	7,200	8,600	10,300	12,700
16	4,100	5,100	6,200	6,800	7,600	8,200	9,400	11,300	13,400	16,600
18	5,200	6,400	7,900	8,600	9,600	10,400	11,800	14,200	17,000	21,000
20	6,400	7,900	9,700	10,600	11,800	12,900	14,600	17,600	20,900	25,900
22	7,700	9,600	11,700	12,900	14,300	15,500	17,700	21,200	25,300	31,300
24	9,200	11,400	13,900	15,300	17,000	18,500	21,000	25,300	30,100	37,300
26	10,800	13,300	16,300	17,900	19,900	21,700	24,600	29,600	35,400	
28	12,500	15,500	18,900	20,800	23,100	25,200	28,600	34,400	41,000	
30	14,300	17,700	21,700	23,900	26,500	28,900	32,800	39,400	47,100	
32	16,300	20,200	24,700	27,200	30,100	32,800	37,300	44,900		
34	18,400	22,800	27,900	30,700	34,000	37,100	42,100			
36	20,600	25,500	31,300	34,400	38,100	41,600	47,200			
42+	Exemption Required									

* Calculations based on: Pulling empty 400-ft pipeline up 10° (17.5%) slope, assuming 0.8 Coefficient of Friction

Table C.2 - Approved Rigging Assemblies for Pulling HDPE Pipe

Nominal Pipe Diameter (inches)	Pipe SDR Rating 32.5	26	21	19	17	15.5	13.5	11	9	7
12	A C E	A CDEF	A CDEF	A CDEF	ABCDEF	ABCDEF	ABCDEF	ABCDEF	ABCDEF	ABCDEF
14	A C E	A CDEF	A CDEF	A CDEF	ABCDEF	ABCDEF	ABCDEF	ABCDEF	ABCDEF	ABCDEF
16	A C E	A CDEF	A CDEF	A CDEF	ABCDEF	ABCDEF	ABCDEF	ABCDEF	ABCDEF	ABCDEF
18	A C E	A CDEF	A CDEF	A CDEF	ABCDEF	ABCDEF	ABCDEF	ABCDEF	CDEF	CDEF
20	A C E	A CDEF	A CDEF	A CDEF	ABCDEF	ABCDEF	ABCDEF	CDEF	CDEF	CDEF
22	A C E	A CDEF	A CDEF	A CDEF	A CDEF	A CDEF	CDEF	CDEF	CDEF	C F
24	A C E	A CDEF	A CDEF	A CDEF	CDEF	CDEF	CDEF	CDEF	CDEF	C F
26	A C E	A CDEF	A CDEF	CDEF	CDEF	CDEF	CDEF	CDEF	C F	
28	A C E	A C EF	CDEF	CDEF	CDEF	CDEF	CDEF	CDEF	C F	
30	A C E	C EF	C EF	C EF	C EF	C EF	C EF	C EF	C F	
32	A C E	C EF	C EF	C EF	C EF	C EF	C EF	C F		
34	C E	C EF	C EF	C EF	C EF	C EF	C EF			
36	C E	C EF	C EF	C EF	C EF	C EF	C EF			
42+	Exemption Required									

* Rigging Assemblies Defined on next page.

** Rigging based on: Pulling empty 400-ft pipeline up 10° (17.5%) slope, assuming 0.8 Coefficient of Friction

Notes:

- Site SOP's will define rigging and pulling procedures for pipe less than 12" diameter
- Without an approved exemption, using a sling as a choker is NOT acceptable for pulling pipelines that are:
  Greater than 50-ft in length AND 12" diameter or greater
- Pipe-slotting or notching (for example, cutting out a section of pipe with a chainsaw) to make an anchor point in order to attach to the pipe is NOT acceptable for pulling pipe that is 12" diameter or greater
- Friction factor of 0.80 used in calculations (Sand/HDPE is published at 0.66)
- An exemption is required for pulling any pipeline that is: Longer than 400 feet AND 12" diameter or greater
- An exemption is required for pulling any pipeline on a slope greater than 10° (17.5% grade)

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Appendix C (continued) - Approved Rigging Assemblies (for 12" Diameter Pipe and Larger)

A) HDPE Fused Pulling Head, 5-ton Swivel

Quantity	Item Description	Supplier	Part Number
1	High Country HDPE Fused Pulling Head*	Polywarehouse	See Support Docs
1	Jaw and Eye Swivel (5-Ton Lift Rating)*	Certex	CX05-0259
As Needed	3/4" Master Link*	Certex	CX05-0708
As Needed	1" Screw Pin Shackle*	Certex	CX10-0026
1	Polyester Tow Sling UTS4-25T x 5 ft*	Certex	CX08-0039-5

B) Single 1-1/2 Skookum Shackle with 2" Sch160 Pipe Bushing Insert, 5-ton swivel

Quantity	Item Description	Supplier	Part Number
1	Skookum 1-1/2" Sheet Pile Shackle, modified	Certex	CX10-0778-HAG1
1	Bushing Insert: 2" Sch 160 Steel Pipe, 2-3/4" length		
1	Jaw and Eye Swivel (5-Ton Lift Rating)*	Certex	CX05-0259
As Needed	3/4" Master Link*	Certex	CX05-0708
As Needed	1" Screw Pin Shackle*	Certex	CX10-0026
1	Polyester Tow Sling UTS4-25T x 5 ft*	Certex	CX08-0039-5

Note: Requires Single 2.5" diameter hole drilled at least 8" from the end of the pipe and then bushing inserted.

C) HDPE Fused Pulling Head, 15-ton Swivel

Quantity	Item Description	Supplier	Part Number
1	High Country HDPE Fused Pulling Head*	Polywarehouse	See Support Docs
1	Jaw and Eye Swivel (15-Ton Lift Rating)*	Certex	CX05-0277
As Needed	1-1/2" Master Link*	Certex	CX05-0712
As Needed	1-1/2" Screw Pin Shackle*	Certex	CX10-0030
	1-3/4" Screw Pin Shackle*	Certex	CX10-0031
1	Polyester Tow Sling UTS10-95T x 5 ft*	Certex	CX08-0045-5
	Polyester Round Sling UTS9-77T x 5 ft* (Alternative Option)	Certex	CX08-0044-5

D) Two 1-1/2" Skookum Shackles, 15-ton swivel

Quantity	Item Description	Supplier	Part Number
2	Skookum 1-1/2" Sheet Pile Shackle, modified	Certex	CX10-0778-HAG1
1	Jaw and Eye Swivel (15-Ton Lift Rating)*	Certex	CX05-0277
As Needed	1-1/2" Master Link*	Certex	CX05-0712
As Needed	1-1/2" Screw Pin Shackle*	Certex	CX10-0030
	1-3/4" Screw Pin Shackle* (Alternative Option)	Certex	CX10-0031
1	Polyester Tow Sling UTS10-95T x 5 ft* (Basketed Arrangement)	Certex	CX08-0045-5
	Polyester Round Sling UTS9-77T x 5 ft* (Basketed Arrangement)	Certex	CX08-0044-5

Note: Requires Two 2" diameter holes drilled at least 8" from the end of the pipe and then bushings inserted.

E) Two 1-1/2" Skookum Shackles with 2" Sch160 Pipe Bushing Insert, 15-ton swivel

Quantity	Item Description	Supplier	Part Number
2	Skookum 1-1/2" Sheet Pile Shackle, modified	Certex	CX10-0778-HAG1
2	Bushing Insert: 2" Sch 160 Steel Pipe, 2-3/4" length		
1	Jaw and Eye Swivel (15-Ton Lift Rating)*	Certex	CX05-0277
As Needed	1-1/2" Master Link*	Certex	CX05-0712
As Needed	1-1/2" Screw Pin Shackle*	Certex	CX10-0030
	1-3/4" Screw Pin Shackle* (Alternative Option)	Certex	CX10-0031
1	Polyester Tow Sling UTS10-95T x 5 ft* (Basketed Arrangement)	Certex	CX08-0045-5
	Polyester Round Sling UTS9-77T x 5 ft* (Basketed Arrangement)	Certex	CX08-0044-5

Note: Requires Two 2-1/2" diameter holes drilled at least 8" from the end of the pipe and then bushings inserted.

F) Two 2" Skookum Shackles, 15-ton swivel

Quantity	Item Description	Supplier	Part Number
2	Skookum 2" Sheet Pile Shackle, modified	Certex	CX10-0778-HAG
1	Jaw and Eye Swivel (15-Ton Lift Rating)*	Certex	CX05-0277
As Needed	1-1/2" Master Link*	Certex	CX05-0712
As Needed	1-1/2" Screw Pin Shackle*	Certex	CX10-0030
	1-3/4" Screw Pin Shackle* (Alternative Option)	Certex	CX10-0031
1	Polyester Tow Sling UTS10-95T x 5 ft* (Basketed Arrangement)	Certex	CX08-0045-5
	Polyester Round Sling UTS9-77T x 5 ft* (Basketed Arrangement)	Certex	CX08-0044-5

Note: Requires Two 2-1/2" diameter holes drilled at least 8" from the end of the pipe.

* Alternative rigging equipment and supplier may be substituted as long as they are determined to have:
- Equivalent function
- Equivalent rating or higher (Working Load Limit must be based on a design factor of at least 3:1)

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Appendix D – HDPE Pipe Unloading/Loading Checklist

Date: _____ Inspected by: _____

Trucking Company: _____ Load Description: _____

HDPE Pipe Receiving Checklist

- ☐ Load has not shifted and is not leaning
- ☐ Pipe is loaded and strapped properly according to Global Sourcing loading guidelines
- ☐ Proper size dunnage (minimum 4x4) is in place between each layer of pipe with chocks on the ends
- ☐ Pipe is free from visible defects or damages

NOTE: If HDPE pipe is not loaded properly or any of the above conditions have not been met, the pipe will not be off-loaded and will be rejected. Any exceptions to this will require an approved exemption and an engineering review. If a load is rejected the local freight coordinator will contact the Phoenix shipping coordinators.

Received and approved: _____

Unloading/Loading Checklist

- ☐ All operators and safety watches have been task trained
- ☐ Operator has completed a pre-use inspection card for equipment
- ☐ Load area is free of other equipment, debris, rocks, holes, etc.
- ☐ Clear access is established to both sides of the truck
- ☐ Truck is sitting with wheels level and it is chocked
- ☐ A 50' safe zone has been established (or a substantial barrier put in place)
- ☐ Safety watch is in place
- ☐ Driver is with the safety watch
- ☐ Area where pipe will be placed is prepped and inspected

Signatures Approving Unloading/Loading:

Driver: _____ Un-loader: _____ Spotter: _____

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Appendix E - HDPE Pipe Handling Engineering Review

This form is to document an engineering review conducted to **perform work that meets** the requirements in the HDPE guidelines. If a task **does not meet the requirements** in the HDPE guidelines and requires an exemption, the HDPE Pipe Handling Area Exemption Request (Appendix B) must be utilized.

Date:	Time:	Division Manager:
Location of Activity:		
Purpose of Activity:		
Description of Work:		
Engineering Review/Risk Mitigation :		
Engineering Reviewer Signature:		
Signature of Project Lead:		
*When completed give a copy of all related documentation to the division record keeper for filling purposes.		